

Megalastrum (Dryopteridaceae) in Andean South America, Part II

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This is a continuation of “*Megalastrum* (Dryopteridaceae) in Andean South America, Part I.” American Fern Journal 104(3): 181–236.

31. *Megalastrum peruvianum* R. C. Moran, J. Prado & Sundue, *sp. nov.*

TYPE.—PERU. **Cusco**: Distr. Maranure, Mesa Pelado, disturbed cloud forest, 12°54'46"S, 72°37'24"W, 2500 m, 5 may 2006, *H. van der Werff, L. Valenzuela, E. Suclli & J. Farfan* 21371 (holotype: LPB!; isotypes: MO! [barcode 6032073, 6032074, 6032075]). **Figs. 31A–H, 32C, 33C.**

Rhizomes erect, scales 15.0–30.0 × 0.5–2.0 mm, appressed, lanceolate to linear-lanceolate, brown, dull, flat to twisted, entire to sparsely denticulate; **leaves** 1.5–2.0 m long; **petiole base scales** like those of the rhizomes but spreading to ascending; **laminae** 0.5–1.5 m long, basally 3-pinnate-pinnatisect, medially 2-pinnate-pinnatisect; **lamina rachises** pubescent abaxially; **basal pinnae** up to 30 cm long, inequilateral; **pinna rachises** abaxially sparsely glandular, pubescent, scaly, the glands ca. 0.1 mm wide, sessile, spherical, yellowish to orangish, the hairs 0.2–0.4 mm long, 3–5-celled, lax, spreading, the scales 2.0–7.0 × 0.3–1.0 mm, ascending to spreading, lanceolate, dark brown to golden brown, firm to thin and subclathrate, lustrous, flat (not twisted or tortuous), entire to sparsely denticulate, adaxially eglandular, densely pubescent, scaly, the hairs 0.6–2.0 mm long, 4–8-celled, spreading to ascending, the scales like those abaxially; **basal basiscopic pinnules of medial pinnae** not enlarged or overlapping the lamina rachis; **costules** with indument like that of the pinna rachises but with smaller scales ca. 2 × 0.5 mm, adaxially like that of the pinna rachises but scales absent; **laminar tissue between veins** abaxially eglandular, pubescent, the hairs 0.1–0.2 mm long, 1- or 2-celled, erect, lax to acicular, adaxially glabrous or pubescent only toward the margins, eglandular, the hairs 0.1–1.0 mm long, 2–8-celled, lax, ascending, appressed; **ultimate veins** on both surfaces visible to obscure, abaxially pubescent, the hairs 0.2–0.6 mm long, 2–5-celled, spreading or appressed-ascending, lax, adaxially the hairs 0.5–1.5 mm long, 2–5-celled, slightly tortuous, spreading to ascending; **lamina margins** eglandular, ciliate, the hairs 0.3–0.8 mm long, 3–6-

celled, acicular, lax, spreading; **indusia** fugacious, minute, consisting of a few hair-like scales, often covered by sporangia and apparently absent; **spores** cristate.

Distribution.—southern Peru, Bolivia; 1200–2500 m.

SELECTED SPECIMENS EXAMINED.—PERU. **Cusco**: Prov. La Convención, Dist. Huayopata, Amaybamba, 2050 m, 12°59'18"S, 72°30'06"W, 22 Nov 2003, *Bonino et al.* 1116 (NY).

BOLIVIA. **Cochabamba**: José Carrasco Torrico, 116 km antigua carretera a Cochabamba-Villa Tunari, 2400 m, 17°08'S, 65°38'W, 6 Jul 1996, *Kessler et al.* 7033 (UC). **La Paz**: Yungas, 1829 m, [16°30'S, 67°30'W], 1885, *Rusby* 425 p.p. (MICH, NY, US).

Megalastrum peruvianum resembles *M. mollicoma* but differs most conspicuously by the lamina pubescence adaxially: the hairs on the ultimate veins adaxially are longer (0.5–1.5 vs. 0.2–0.5 mm), and the lamina tissue between the veins adaxially is glabrous or only sparsely pubescent near the margins (vs. conspicuously pubescent with tortuous, appressed hairs).

32. *Megalastrum platylobum* (Baker) A. R. Sm. & R. C. Moran, Amer. Fern J. 77:128. 1987 [published 3 May 1988]. *Polypodium platylobum* Baker, Syn. Fil. 307. 1867. *Polypodium tarapotense* Baker, Syn. Fil. 2:505. 1874. *Dryopteris tarapotense* (Baker) C. Chr., Ind. Fil. 297. 1905. *Dryopteris platyloba* (Baker) C. Chr., Ind. Fil. 285. 1905. TYPE.—PERU. San Martín: Mt. Guayrapurima, near Tarapoto, [5°59'S, 79°18'W], [elevation unknown], Aug 1856, *R. Spruce* 4656 (lectotype, designated by Tryon and Stolze, 1991: K! [barcode 000200140, 000200141; isoelectotypes: BM! [barcode 000777145, 000777146], BR-n.v. [barcode 6978211], K! [barcode 000200142, 000200143, 000200144]). **Figs. 16A, 25L–O, 32C.**

Rhizomes erect, scales ca. 15.0 × 1.0 mm, appressed to ascending, linear-lanceolate, golden brown, lustrous, strongly denticulate, the teeth often bifid; **leaves** 0.8–1.2 m long; **petiole base scales** like those of the rhizomes but spreading to loosely ascending; **laminae** to 0.8 m long, basally 2-pinnate-pinnatisect, medially 1-pinnate-pinnatisect to 2-pinnate-pinnatifid; **lamina rachises** pubescent abaxially; **basal pinnae** 10–20 cm long, inequilateral, the segments adnate; **pinna rachises** abaxially eglandular, densely pubescent, sparsely scaly (sometimes apparently absent), the hairs 0.1–0.5 mm long, of distinctly mixed sizes, 1–4-celled, acicular, straightish, erect to spreading, the scales 0.5–3.0 × 0.1–0.3 mm, filiform (2–4 cells wide), appressed, dark brown, denticulate, adaxially eglandular, pubescent, scales absent, the hairs 0.5–0.8 mm long, 4–6-celled, appressed-ascending to antrorsely strigose, light brown; **basal basiscopic pinnules of medial pinnae** not enlarged or overlapping the lamina rachis; **costules** abaxially eglandular, subglabrous to pubescent, scales absent, the hairs like those on the pinna rachises abaxially, adaxially sparsely pubescent with hairs like those on the pinna rachises; **laminar tissue between veins** abaxially eglandular, subglabrous to pubescent,

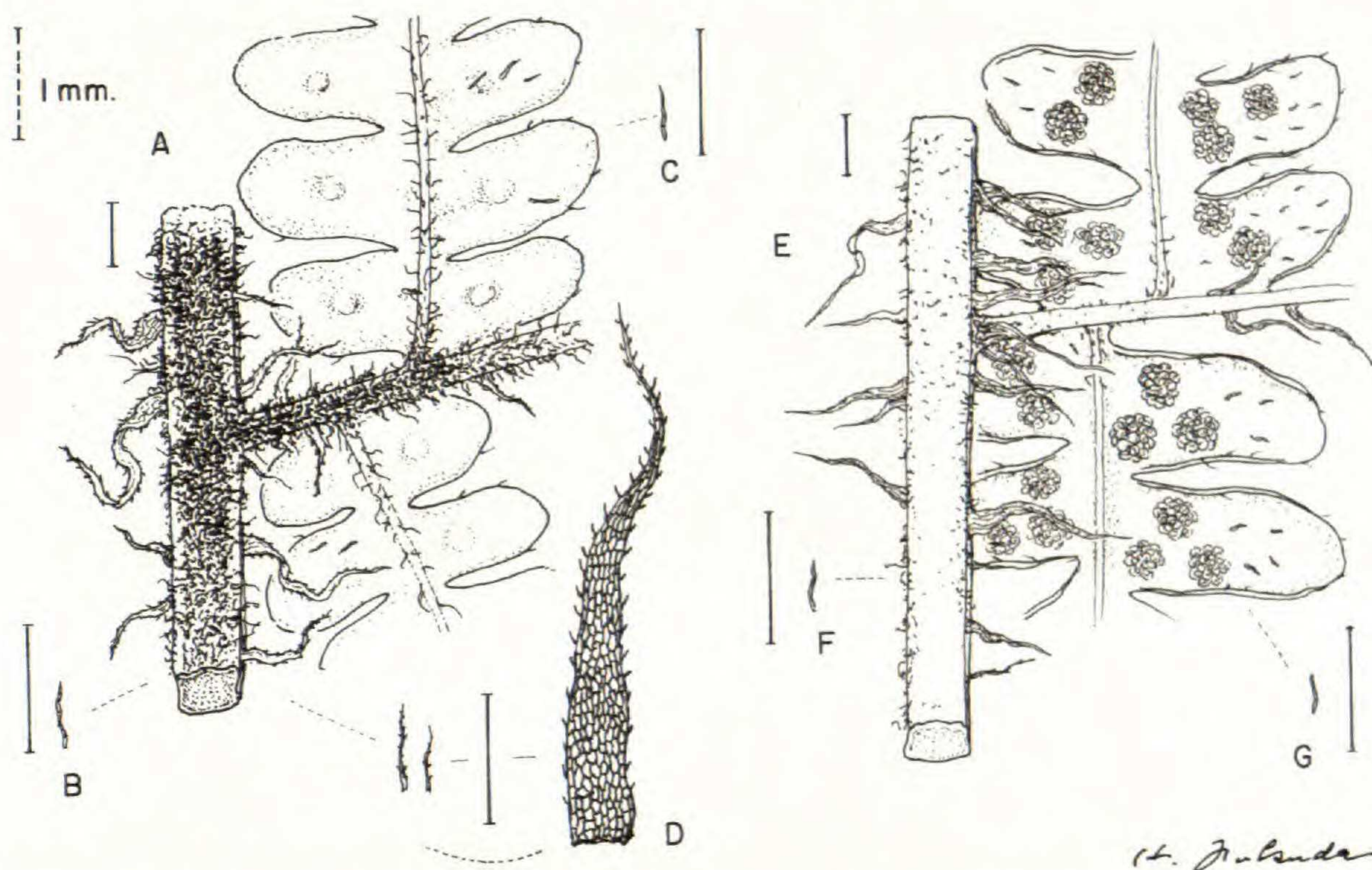


FIG. 19. Indument detail of *Megalastrum clathratum*. A. Adaxial surface of lamina rachis, pinna rachis, and pinnules. B. Hair detail. C. Marginal hair. D. Clathrate scale. E. Abaxial surface of lamina rachis, pinna rachis, and pinnules. F. Hair detail. Scale bars = 1 mm. A–F: van der Werff et al. 23179 (MO).

the hairs 0.1–0.4 mm long, 1-celled, erect, hyaline, acicular, adaxially glabrous; **ultimate veins** visible on both surfaces or sometimes obscure adaxially, abaxially glabrous to sparsely pubescent, eglandular, the hairs like those on the laminar tissue, adaxially glabrous; **lamina margins** eglandular, ciliate, the hairs 0.1–0.3 mm long, 1–3-celled, acicular, ascending or appressed; **indusia** absent; **spores** cristate.

Distribution.—Peru; known only from the type; exact elevation unknown.

Megalastrum platylobum is distinctive by hairs of mixed lengths along the pinna rachises abaxially. The smallest hairs are 0.1 mm long, and these intergrade with sparser hairs up to 0.5 mm long. Both types of hairs are erect and whitish. Also distinctive of this species are laminae medially 1-pinnate-pinnatisect to 2-pinnate-pinnatifid and basal pinnae inequilateral (i.e., prolonged basiscopically). The pinna rachis scales are sparse or seemingly absent.

Megalastrum platylobum greatly resembles several other Andean species in size and cutting of the laminae, but none of these have the hairs of mixed lengths. The common and widespread *M. biseriale* differs by pinna rachises abaxially either glabrous or, if pubescent, the hairs sparser and more equal-sized. *Megalastrum fibrillosum* differs by pinna rachis scales more numerous, firmer, spreading, and if pubescent on the lamina rachises, then the hairs shorter (ca. 0.1–0.2 mm long). *Megalastrum reductum* is similar but differs by



FIG. 20. Indument of three species of Andean *Megalastrum*. A–G. *M. ctenitoides*. A. Abaxial surface of leaf rachis, pinna rachis, and pinna. B. Abaxial surface of leaf rachis. C. Detail of rachis-pinna juncture. D. Rachis scale. E. Hairs and scales of pinna rachis. F. Adaxial surface of segment. G. Adaxial surface of leaf rachis. H–M. *M. mollicoma*. H. Abaxial surface of leaf rachis, pinna rachis, and pinna. J. Hairs from costule. K. Hairs and scales of pinna rachis. L. Adaxial surface of rachis, and pinna. N. Hairs and scales of pinna rachis. O. Hairs and scales of pinna rachis. P. Sori on pinna. Q. Sori on pinna. R. Sori on pinna. S. Sori on pinna. T. Sori on pinna. U. Sori on pinna. V. Sori on pinna. W. Sori on pinna. X. Sori on pinna. Y. Sori on pinna. Z. Sori on pinna. 1 mm.

pinna rachises abaxially with smaller, evenly lengthened (0.1–0.2 mm long), strigose hairs. *Megalastrum bolivianum* differs by long hairs on the veins adaxially. See Christensen (1912) for discussion of the synonymy and nomenclature of this species and the names proposed by Baker.

- 33. *Megalastrum pleiosoros*** (Hook. f.) A. R. Sm. & R. C. Moran, Amer. Fern J. 77:129. 1987 [published 3 May 1988]. *Polypodium pleiosoros* Hook. f., Trans. Linn. Soc. London Botany 20:166. 1847. *Dryopteris pleiosoros* Svens., Bull. Torrey Bot. Club 65:316. 1938, as “*pleiosora*”. *Ctenitis pleiosoros* (Hook. f.) C. V. Morton, Leaflet W. Bot. 8:190. 1957, as “*pleiosora*”. TYPE.—ECUADOR. Galapagos Islands: James Island [San Salvador], [0°17'N, 90°42'W], without precise date, C. R. Darwin s.n. (holotype: CGE!). **Figs. 24D, 27A, 28A–J.**

Rhizomes erect, scales 18.0–25.0 × 0.7–1.3 mm, appressed, linear-lanceolate, gold-brown, lustrous, tortuous, the margins denticulate, the teeth simple or bifid; **leaves** up to 1 m long; **petiole base scales** like those of the rhizomes but shorter, to 12.0 mm long, and spreading; **laminae** to 0.8 m long, basally 2-pinnate, medially 1-pinnate-pinnatisect; **lamina rachises** pubescent abaxially; **basal pinnae** 8.0–15.0 cm long, equilateral, the segments adnate; **pinna rachises** abaxially eglandular, pubescent, and scaly, the hairs 0.6–1.0 mm long, 6–8-celled, spreading, acicular, hyaline, the scales 2.0–3.0 × 0.05–0.20 mm, spreading to loosely ascending, linear-lanceolate, tortuous, brown, lustrous, denticulate, the teeth simple or sometimes bifid, adaxially eglandular, densely pubescent, sparsely scaly, the hairs 1.0–1.5 mm long, 7–9-celled, tan, acicular, spreading, the scales similar to those abaxially; **basal basiscopic pinnules of medial pinnae** not enlarged or overlapping the lamina rachis; **costules** abaxially eglandular, sparsely pubescent, the hairs like those of the pinna rachises, adaxially eglandular, pubescent, lacking scales, the hairs similar to those abaxially; **laminar tissue between veins** abaxially sparsely glandular, sparsely to densely pilose, the glands stalked, 0.3 mm long, the hairs 0.3 mm long, 2- or 3-celled, acicular, erect, hyaline, adaxially eglandular, subglabrous to sparsely pubescent, the hairs ca. 0.5 mm long, 3- or 4-celled, ascending, acicular; **ultimate veins** visible on both surfaces, abaxially eglandular, sparsely pubescent, hairs 0.3–0.5 mm long, 3- or 4-celled, spreading or erect, acicular, hyaline; adaxially eglandular, sparsely pubescent, the hairs 0.1 mm long, 4–7-celled, ascending to appressed, acicular, hyaline; **lamina margins** eglandular, ciliate, the hairs 0.5–0.7 mm long, 4–8-celled, erect, acicular, ascending; **indusia** absent; **spores** cristate.

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rachis, pinna rachis, and pinnule. M. Adaxial surface. N–Q. *M. galapagense*. N. Abaxial surface of rachis lamina, pinna rachis, and pinnules. O. Rachis scales; note bifid teeth. P. Abaxial surface of leaf rachis, pinna rachis, and pinnules. Q. Adaxial surface of pinna. Scale bars = 1 mm. A–G: MacDougal et al. 3886 (MO); H–N: Herrera 9130 (UC). N–Q: Isotype, van der Werff 2244 (U).

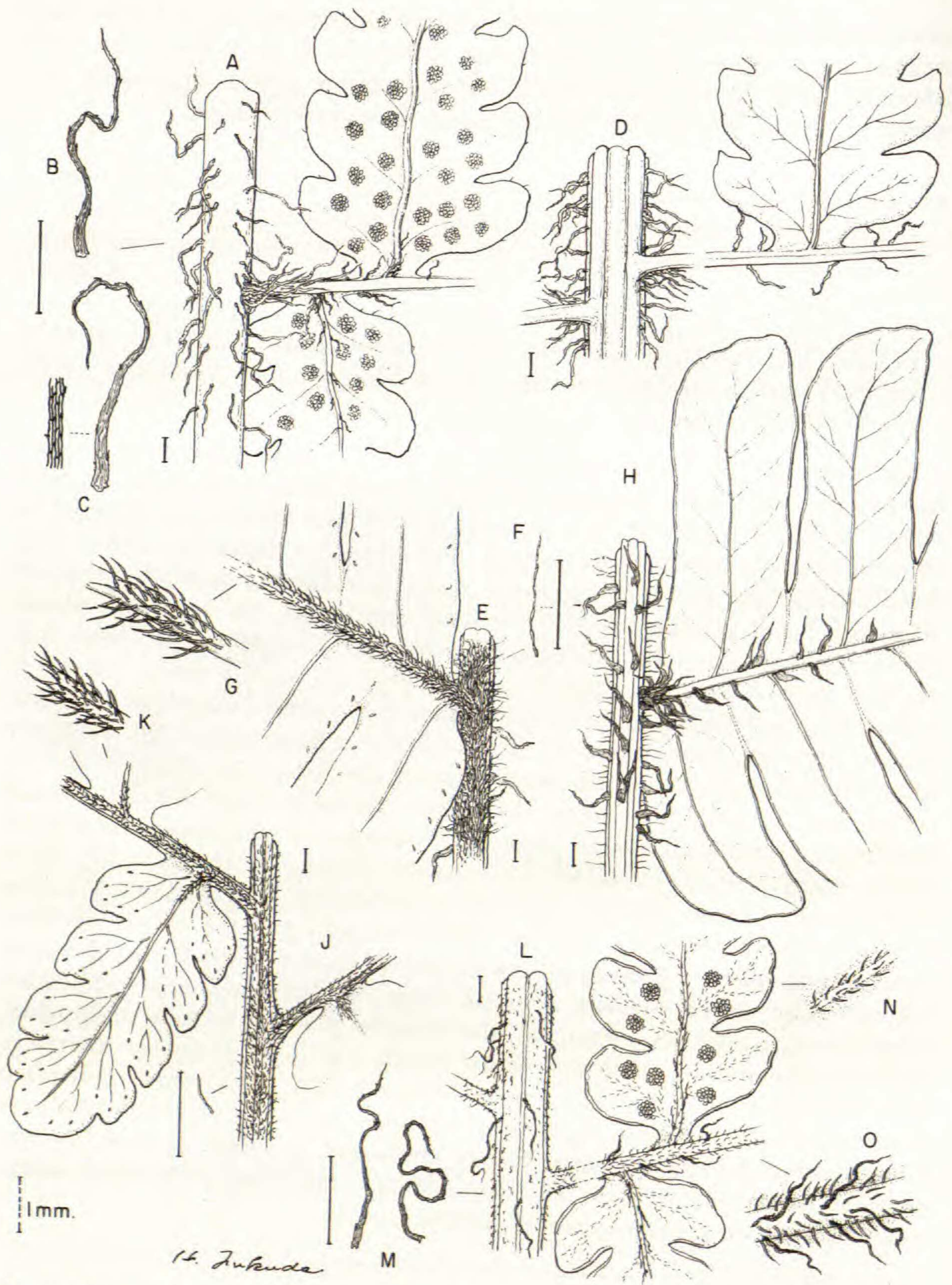


FIG. 21. Indument of three Andean species of *Megalastrum*. A–D. *M. polybotryoides*. A. Abaxial surface of rachis and pinnae. B, C. Rachis scales. D. Adaxial surface of rachis and pinnule. E–H. *M. ctenitoides*. E. Adaxial surface of rachis and pinna. F. Rachis scale. G. Rachis hair. H. Abaxial surface of rachis and pinna. I–O. *M. reductum*. J. Adaxial surface of rachis, costa, and pinnule. K. Costal hairs. L. Abaxial surface of rachis and pinnules. M. Rachis scales. N. Hairs from costule. O.

Distribution.—Galapagos Islands; shaded moist gullies and potholes in lava (Wiggins and Porter, 1971); 400–800 m.

SELECTED SPECIMENS EXAMINED.—ECUADOR. **Galápagos**: Fernandina Island, Green Crater, 600 m, [0°40'S, 90°33'W], 17 Sep 1977, *Adersen* 887 (C); Idefatigable Island, Mt. Crocker, 9 May 1932, *Howell* 9230 (GH); Isabella Island, SW slope of Volcano Cerro Azul, 800 m, [0°01'S, 91°12'W], Aug 1975, *van der Werff* 2267 (NY, QCA, U); Pinta Island, in the old crater, central part of island, 590 m, [0°36'N, 90°45'W], 25 Mar 1972, *Hamann* 915 (C); Santa Cruz Island, between Cerro Colorado II and Puntudo, 700 m, [0°38'S, 90°22'W], 18 Apr 1977, *Adersen* 84 (C, QCA); idem, Miconia belt near Media Lunz, 800 m, [0°38'S, 90°22'W], May 1974, *van der Werff* 966 (NY, U); San Cristóbal Island, Wrick Bay, 800 m, [0°48'S, 89°24'W], 6 Jul 1905–1906, *Stewart* 914 (GH, MO, US); San Salvador Island, El Campamento Central, 570 m, [0°15'S, 90°42'W], 16 Aug 1972, *Hamann* 1985 (C).

Megalastrum pleiosoros is characterized by laminae medially 1-pinnate-pinnatisect, pinnae equilateral, and pinna rachises and costules abaxially pubescent by hairs 0.6–1.0 mm long. This species and *M. galapagense* are the only *Megalastrum* in the Galapagos Islands. See *M. galapagense* for comparison. These two species greatly resemble *M. microsorum* from mainland Ecuador and Peru. That latter species differs by laminae abaxially either glabrous or shorter-pubescent with fewer-celled hairs (0.2–0.5 mm long, 2- or 3-celled).

34. *Megalastrum polybotryoides* R. C. Moran, J. Prado & Sundue, *sp. nov.*

TYPE.—ECUADOR. Napo: proyecto de carretera Salcedo - Tena, 5 km desde donde termina el carretero desde Tena, camino a Verde-Yacu, 1°02'S, 77°52'W, 10 Aug 1994, *H. Navarrete* 538 (holotype: QCA! 2-sheets; isotypes: AAU! 3-sheets, QCNE-n.v.). **Figs. 5A, 21A–D, 29C.**

Rhizomes not seen; **leaves** 1.0–1.5 m long; **petiole base scales** ca. 10.0×1.0 mm, appressed to spreading, linear-lanceolate, light brown, lustrous, twisted, sparsely denticulate; **laminae** ca. 0.8 m long, basally 2-pinnate-pinnatifid, medially 2-pinnate; **lamina rachises** abaxially without hairs, glandular, the glands 0.1 mm long, globose, sessile; **basal pinnae** up to 22.0 cm long, equilateral, segments adnate; **pinna rachises** abaxially densely glandular, without hairs, scaly, the glands ca. 0.1 mm wide, sessile, spherical, brown, the scales $2.0\text{--}5.0 \times 0.5$ mm, appressed to loosely spreading, linear-lanceolate, brown, lustrous, tortuous, sparsely denticulate, adaxially densely glandular, sparsely pubescent, scaly, the glands and scales similar to those

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Costal hairs and scales. All scale bars = 1 mm. A–D: Isotype, *Navarrete* 538 (AAU). E–H: *Ollgaard et al.* 2233 (AAU). J–O: Isotype, *Camp* 3786 (K).

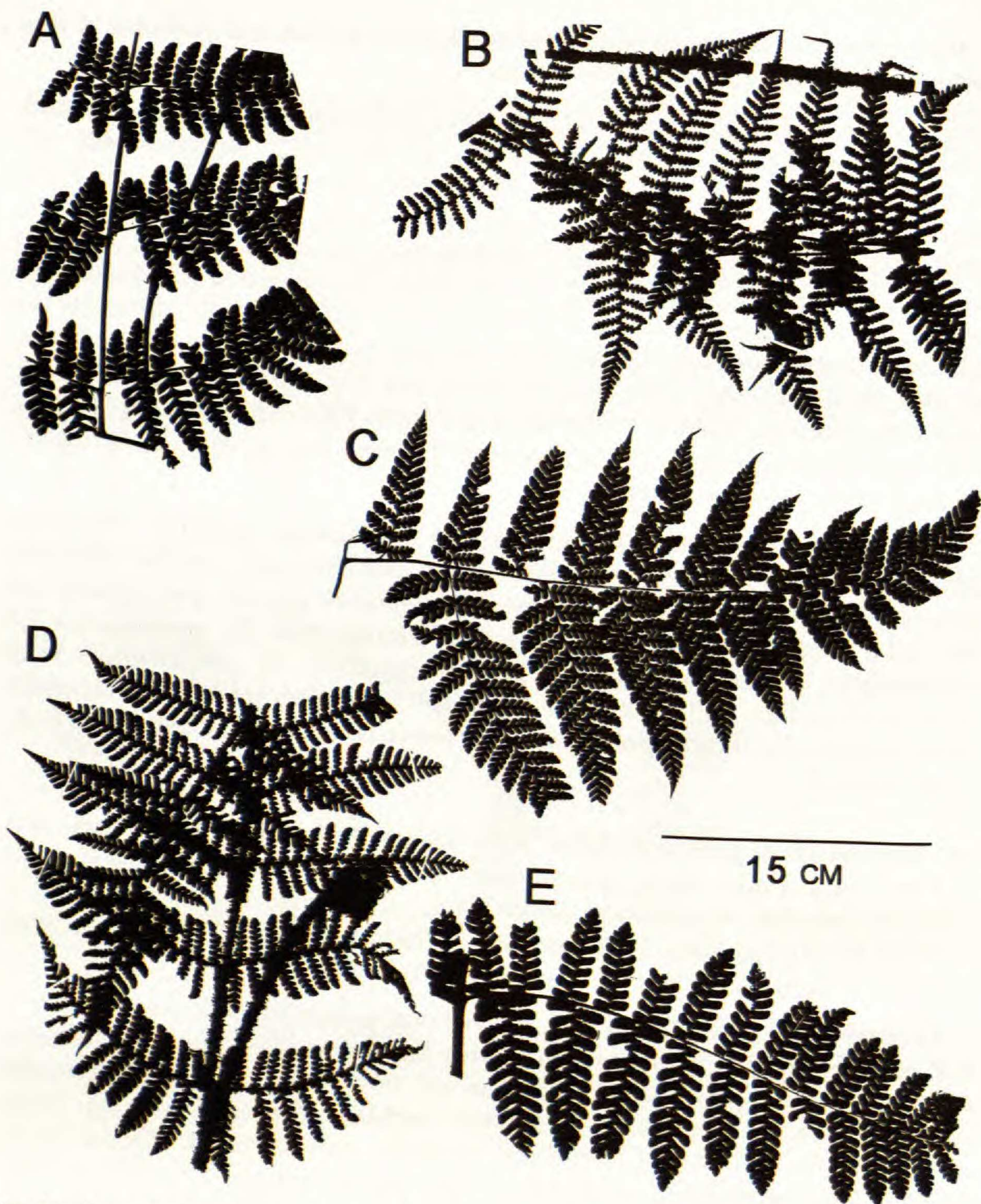


FIG. 22. Lamina dissection in five species of Andean *Megalastrum*. A. Proximal half of leaf, *M. nigromarginatum*. B. Medial pinna, *M. decompositum*. C. Basal pinna, *M. oreophilum*. D. Leaf, *M. rhachisquamatum*. E. Basal pinna, *M. miscellum*. A: Holotype, Tryon & Tryon 6103 (GH). B: van der Werff et al. 12506 (UC). C: Smith 1023 (NY). D: Øllgaard 98413 (AAU). E: Killip et al. 10394 (NY).

abaxially, the hairs 0.2–0.4 mm long, 2–5-celled, appressed to spreading, acicular, light brown, ascending; **basal basiscopic pinnules of medial pinnae** not enlarged or overlapping the lamina rachis; **costules** abaxially sparsely glandular and sparsely scaly, without hairs, the glands like those of the pinna

rachises, the scales ca. 1.0×0.3 mm, light brown, lanceolate, appressed to loosely ascending, lustrous, sparsely denticulate, adaxially sparsely glandular, without hairs, without scales; **laminar tissue between veins** on both surfaces sparsely glandular, without hairs, the glands like those of the pinna rachises, the glands like those of the pinna rachises; **ultimate veins** sparsely glandular and without hairs on both surfaces, the glands similar to those on the lamina tissue; **lamina margins** eglandular, sparsely ciliate, the hairs ca. 0.1 mm long, 1- or 2-celled, acicular, ascending; **indusia** absent; **spores** cristate.

Distribution.—Ecuador, eastern side of Andes; 650 m.

SPECIMENS EXAMINED.—ECUADOR. **Napo**: Proyecto de carretera Salcedo-Tena, 5 km desde donde termina el carretero desde Tena, camino a Verde-Yacu, 650 m, $1^{\circ}02'S$, $77^{\circ}52'W$, 10 Aug 1994, *Navarrete 539, 540* (AAU, QCA!).

Megalastrum polybotryoides is distinctive by the leaf axes on both surfaces glandular and pinna rachises adaxially hairless. The glands are sessile, spherical, numerous, and brown. They are sometimes easily overlooked. The specific epithet refers to the lamina division, which resembles that of *Polybotrya caudata* Kunze and *P. pubens* Mart.

35. *Megalastrum praetermissum* R. C. Moran, J. Prado & Sundue, *sp. nov.*

TYPE.—ECUADOR. Morona-Santiago: Gualaquiza Cantón, within 3 km of town of Gualaquiza, E of town and of Río Gualaquiza, $3^{\circ}24'S$, $78^{\circ}34'W$, 1000 m, 08 May 1993, *A. Fay & L. Fay 4250* (holotype: QCNE!; isotypes: AAU!, MO! [barcode 04911841, 04911842, 049118433], NY! [barcode 871000], UC! [barcode 1616316]). **Figs. 13A, 32D, 35F–M.**

Rhizomes erect, to 15 cm long, scaly, the scales $20.0\text{--}30.0 \times 0.5\text{--}1.0$ mm, ascending to appressed, linear to linear-lanceolate, castaneous, lustrous, flat or slightly twisted, denticulate, the teeth often bifid; **leaves** 1.0–3.5 m long; **petiole base scales** $0.8\text{--}15.0 \times 0.4\text{--}0.7$ mm, spreading, filiform, golden brown to castaneous, lustrous, twisted, not only slightly tortuous, strongly denticulate; **laminae** 0.7–1.5 m long, basally 3-pinnate-pinnatisect, medially 2-pinnate-pinnatisect; **lamina rachises** without hairs abaxially; **basal pinnae** 0.3–0.7 m long, strongly inequilateral; **pinna rachises** abaxially eglandular, without hairs, sparsely to moderately scaly, the scales up to $5 \times 0.2\text{--}0.3$ mm, linear, brown, concolorous (not darker distally), strongly denticulate, the teeth often bifid, linear, appressed to spreading, adaxially pubescent, eglandular, scaly, the hairs up to 0.5 mm long, 3–5-celled, spreading, the scales like those on the abaxial surfaces; **basal basiscopic pinnules of medial pinnae** not enlarged or overlapping the lamina rachis; **costules** abaxially eglandular, pubescent, scaly, the hairs 0.4–0.7 mm long, 3- or 4-celled, the scales like those of the pinna rachises but shorter, 1.0–2.0 mm long, linear, adaxially pubescent, eglandular, sparsely scaly, the hairs 0.5–1.5 mm long, 4- or 5-celled, the scales ca. 0.5 mm long; **laminar tissue between veins** abaxially eglandular, puberulent to glabrous, the hairs (when present) ca. 0.1 mm long, fine and easily overlooked, acicular, erect, hyaline, adaxially glabrous; **ultimate veins**

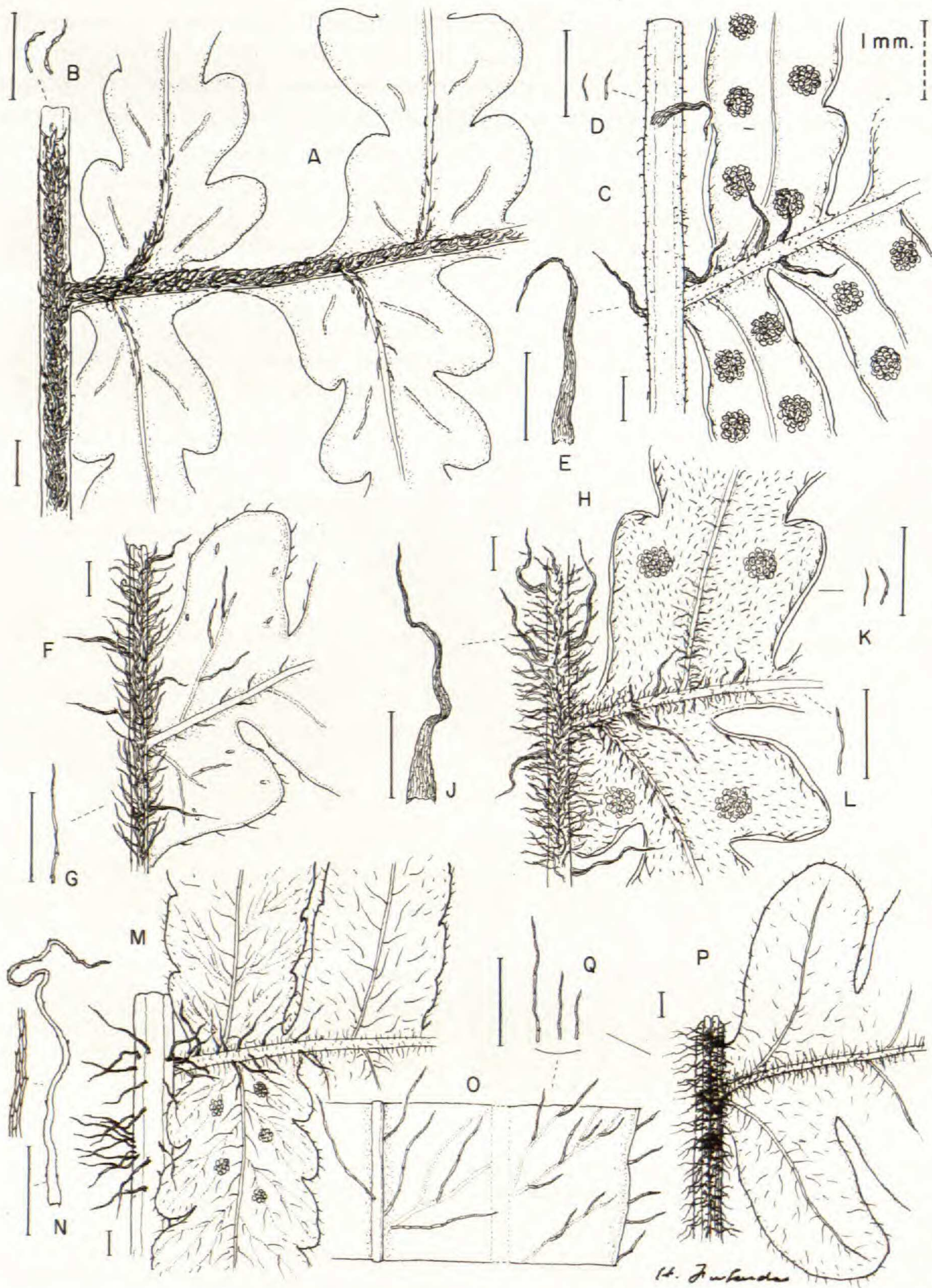


FIG. 23. Indument detail of three Andean species of *Megalastrum*. A–E. *M. falcatum*. A. Adaxial surface of pinnules, lamina and pinna rachises. B. Lamina rachis hairs. C. Abaxial surface of lamina rachis, pinna rachis, and segments. D. Detail of hairs. E. Scale from lamina rachis. F–L. *M. pubescens*. F. Adaxial surface of pinna rachis and segment. G. Hair detail. H. Abaxial surface of lamina rachis, pinna rachis, and pinnules. J. Scale detail. K, L. Hair details. M–Q. *M. molle*. M.

abaxially eglandular, sparsely and finely pubescent, the hairs 0.1–0.3 mm long, 1- or 2-celled, acicular, erect, hyaline, adaxially glabrous to pubescent, the hairs (when present) 0.3–2.0 mm long, 4–6-celled, ascending to spreading and slightly tortuous; **lamina margins** eglandular, ciliate, the hairs 0.1–0.4 mm long, 2- or 3-celled, ascending to spreading; **indusia** absent; **spores** cristate.

Distribution.—Colombia, Ecuador, Peru, Bolivia, eastern side of Andes; 280–2170 m.

SELECTED SPECIMENS EXAMINED.—COLOMBIA. **Putumayo:** márgenes del Río Güamues, San Antonio de Güamues, 310 m, [0°34'N, 76°50'W], 19 Dec 1940, *Cuatrecasas 11185* (F).

ECUADOR. **Azuay:** Baños-Pintuc, [2°57'S, 79°06'W], s.d., *Stubel 943* (B). **Morona-Santiago:** Morona Cantón, near city of Macas, 1100 m, 02°20'S, 78°08'W, 22 Jul 1993, *Fay & Fay 4097* (AAU, MO, NY, QCNE); within 3 km of the town of Gualaquiza, 1000 m, 03°24'S, 78°34'W, 8 Mar 1993, *Fay & Fay 4232* (AAU, MO, NY, QCNE). **Napo:** Santa Rosa at Río Napo, [0°49'S, 75°30'W], 30 Apr 1972, *Lugo 2064* (AAU, GH, MO, U). **Pastaza:** East of Puyo, along the road to Macas, and wet forest around the Municipal, 950 m, 01°30'S, 77°59'W, 14 Jul 1992, *Fay & Fay 3662* (MO, NY, QCNE). **Zamora-Chinchipe:** Zamora, within 3 km of the town of Zamora, 1000 m, 4°03.5'S, 78°57.5'W, 7 Dec 1994, *Fay & Fay 4403* (AAU, MO, QCNE).

PERU. **Bagua:** valley of Río Marañon above Cascadas de Mayasi near Campamento Stte. Montenegro, Kms 280–284 of Marañon road, 450–600 m, [5°18'S, 78°25'W], 5 Sep 1962, *Wurdack 1851* (US). **Cajamarca:** San Ignacio, Ricardo Palma, 1720 m, 5°07'29"S, 79°03'16"W, 19 May 1998, *Campos & Lopez 4911* (MO, NY). **Cusco:** Paucartambo, Hacienda Villa Carmen, 540 m, [13°18'S, 71°35'W], 19 Jul 1963, *Vargas 14685* (GH). **Pasco:** Oxapampa, Gran Pajonal, vicinity of Chequitavo, 1200 m, 10°45'S, 74°23'W, 26 Sep 1983, *Smith 5260* (F, MO).

BOLIVIA. **Beni:** Prov. Gral. Ballivián, 16 km por el camino maderero, 12 km de Yucumo a Rurrenabaque, 450 m, 15°05'S, 67°07'W, 23 Jul 1997, *Kessler et al. 10774* (GOET, UC). **Carrasco:** Cochabamba, Localidad Dianpampa, 2160 m, 17°40'53"S, 64°40'55"W, 4 Sep 2003, *Fernández et al. 2366* (MO). **Cochabamba:** Prov. José Carrasco Torrico, 143 km antigua carretera Cochabamba-Villa Tunari, 1300 m, 17°07'S, 65°34'W, 23 Aug 1996, *Kessler et al. 7631* (GOET, UC). **La Paz:** Prov. Abel Iturralde, Río San Antonio, 46 km de Ixiamas a Alsto Madidi, 300 m, 13°38'S, 68°26'W, 13 Aug 1997, *Kessler et al. 11131* (GOET, UC). **Santa Cruz:** Nuflo de Chavez, Serranía de San Lorenzo, 2 km E of Est. Las Maras, 500–900 m, 16°15'S, 62°35'W, 3 Nov 1985, *Killeen 1383* (F, MO, NY, UC).

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Abaxial surface of lamina and pinna rachises and pinnules. N. Rachis scale. O. Hairs on abaxial surface of lamina. P. Adaxial surface of pinnule. Q. Detail of hairs. Scale bars = 1 mm. A–E: holotype, *Croat et al. 91165* (MO). F–L: Isotype, *Killip & Smith 20453* (NY). M–Q: Isotype, *van der Werff et al. 16300* (NY).

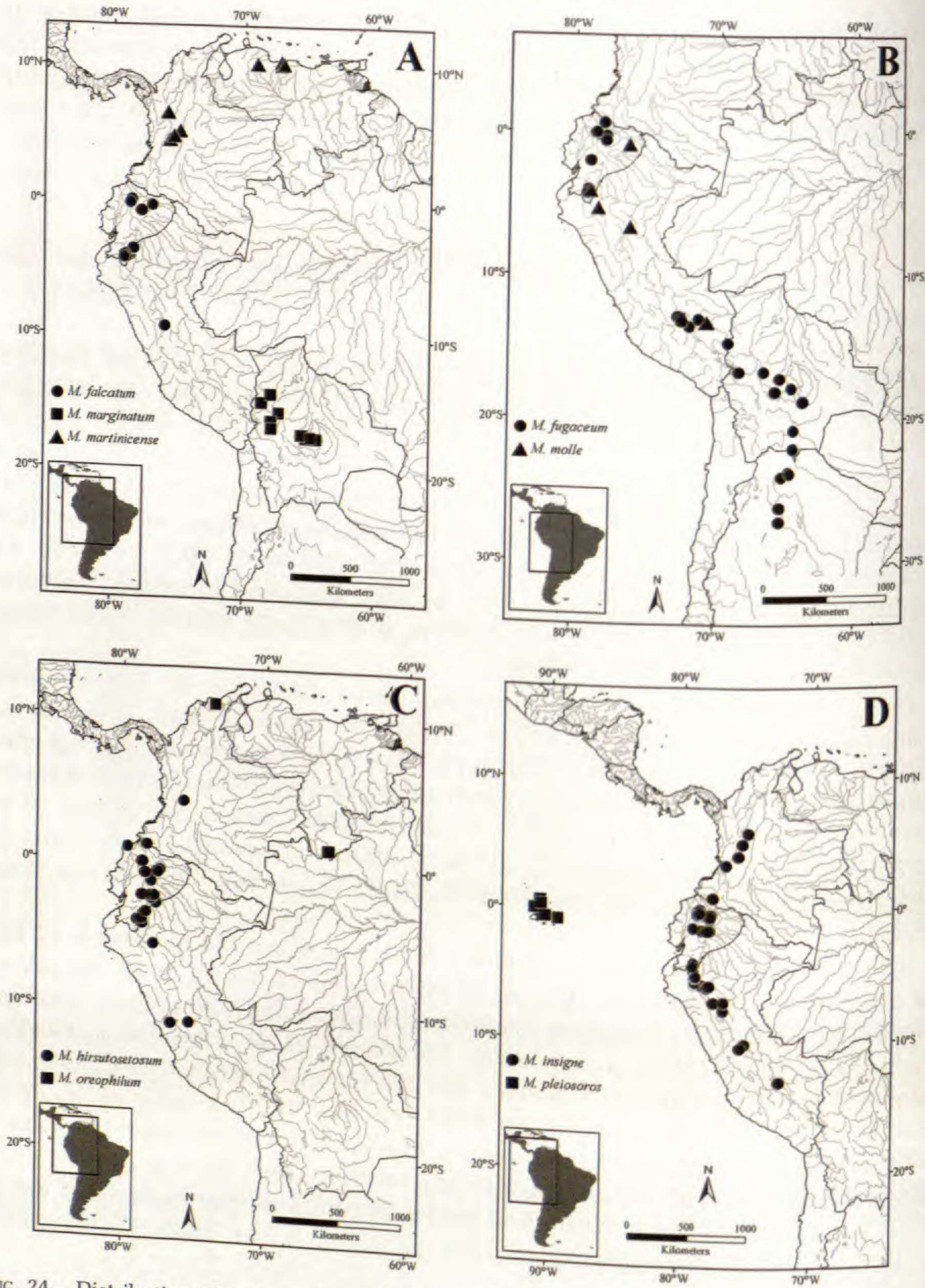


FIG. 24. Distribution of nine species of *Megalastrum* in the Andes. Some species are also known from areas outside the Andean region as here defined; for the worldwide distribution of a species, see under each species description.

Megalastrum praetermissum is distinctive by the linear, brown denticulate scales along the pinna rachises. It varies considerably in pubescence on both surfaces of the lamina. In most specimens there are at least a few ca. 0.1 mm long, erect, acicular hairs between the veins abaxially. These hairs are easily overlooked, especially when viewed from above, and thus the specific epithet *praetermissum* meaning "overlooked," or "passed by." These minute hairs are best seen in profile on folded portions of the lamina. Adaxially, the pubescence (when present) is quite different, with the veins and midribs of the ultimate segments bearing conspicuous whitish hairs 0.3–2.0 mm long. These hairs vary from sparse and inconspicuous to dense and conspicuous.

Megalastrum praetermissum resembles *M. marginatum* in lamina division, presence of filiform scales on the petiole bases and pinna rachises, and long hairs on the veins adaxially; however, *M. praetermissum* differs by pinna rachises abaxially glabrous and laminae between the veins minutely and inconspicuously pubescent.

36. *Megalastrum pubescens* A. Rojas, Métodos en Ecología y Sistemática (MES) 3(Supl. 1):44, fig. 5. 2008. TYPE.—COLOMBIA. Norte de Santander: Eastern Cordillera, N of Toledo, Loso and vicinity, [7°02'N, 72°05'W], 2200–2400 m, 6–7 Mar 1927, *E. P. Killip & A. C. Smith 20453* (holotype: NY! [barcode 0871575]; isotype: US-n.v.). **Figs. 5A, 18D, 23F–L.**

Rhizomes erect, scales 5.0–13.0 × 0.3–0.7 mm, appressed to strongly ascending, linear, concolorous, flat, sparsely denticulate; **leaves** to 0.8–1.0 m long; **petiole base scales** like those of the rhizomes but loosely spreading to ascending; **laminae** 0.4–0.6 m long, basally 3-pinnate-pinnatisect, medially 2-pinnate-pinnatifid; **lamina rachises** pubescent abaxially; **lamina rachises** pinnate-pinnatifid; **basal pinnae** ca. 30.0 cm long, strongly inequilateral; **pinna rachises** abaxially eglandular, glabrous to sparsely pubescent, sparsely scaly, the hairs 0.3–0.5 mm long, 2–4-celled, acicular, spreading, the scales 3.0–4.5 × 0.2–0.3 mm, linear-lanceolate, brown, flat, subentire to denticulate, the teeth not bifid, adaxially eglandular, densely pubescent, scales absent, the hairs 0.4–1.0 mm long, 4–7-celled, ascending to spreading, acicular; **basal** **basiscopic pinnules of medial pinnae** not enlarged or overlapping the lamina rachis; **costules** abaxially eglandular, puberulent, sparsely scaly, hairs 0.3–0.5 mm long, 2–4-celled, acicular, spreading, the scales up to 7.0 × 0.2 mm, linear-lanceolate, brown, lustrous, subentire, adaxially with indument similar to those of the abaxial surfaces; **laminar tissue between veins** abaxially glandular, densely pubescent, the hairs sometimes glandular-tipped, 0.2–0.3 mm long, 1–3-celled, erect, acicular, adaxially glabrous; **ultimate veins** visible on both surfaces, abaxially eglandular, puberulent, the hairs like those on the lamina tissue, adaxially very sparsely pubescent, the hairs like those on the costules; **lamina margins** eglandular, ciliate, the hairs 0.3–0.5 mm long, 1- or 3-celled, ascending to spreading, acicular; **indusia** absent; **spores** cristate.

Distribution.—Colombia; 2000–2400 m.

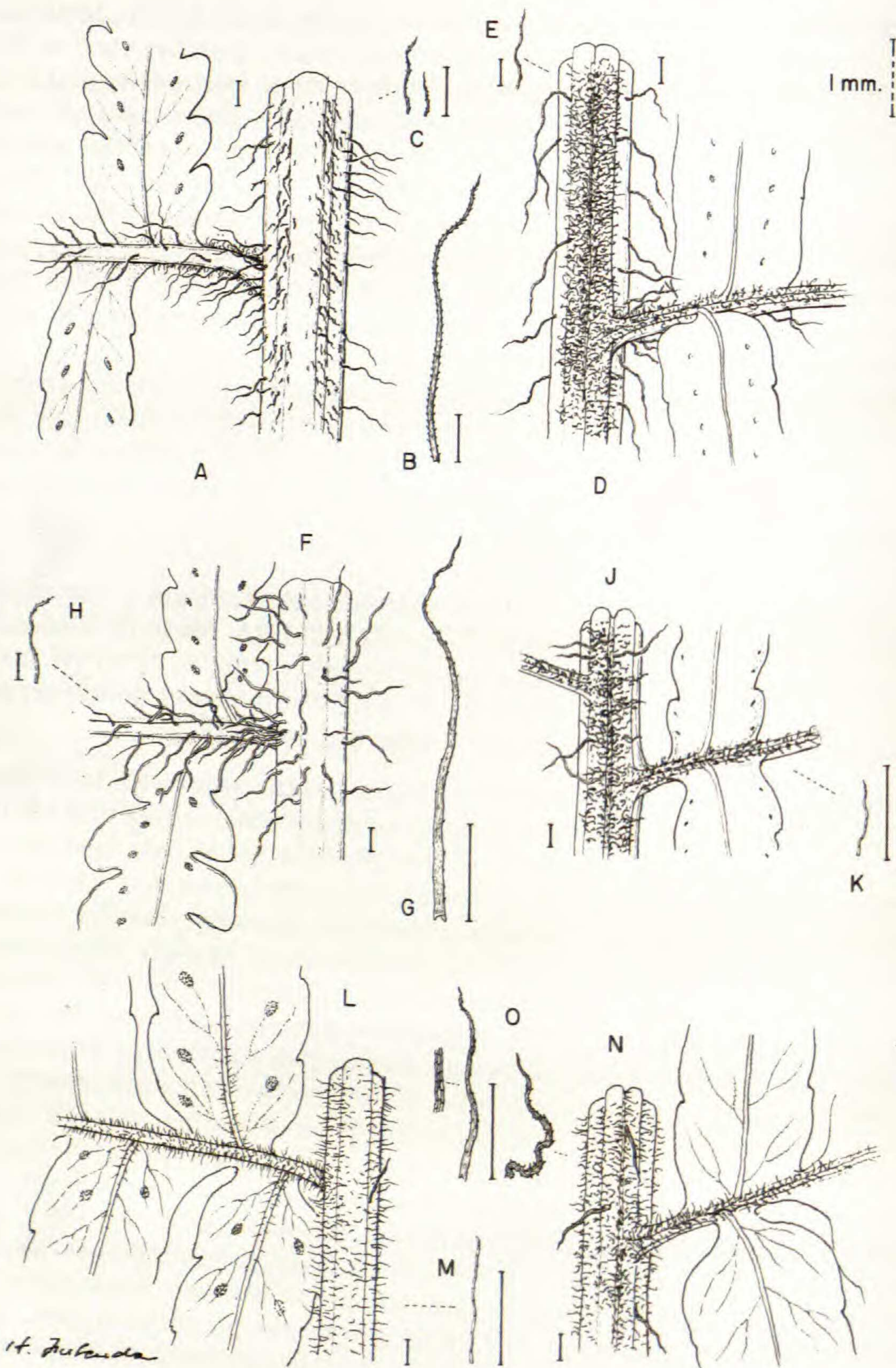


FIG. 25. Indument detail of three Andean species of *Megalastrum*. A–D. *M. microsorum*. A. Abaxial surface of rachis and pinnae. B. Rachis scale. C. Rachis hairs. D. Adaxial surface of rachis and pinnae. E. Rachis hair. F–K. *M. fibrillosum*. F. Abaxial surface of rachis and pinnae. G. Rachis scale. H. Costal scale. J. Adaxial surface of rachis and pinna. K. Costal hair. L–O. *M. platylobum*. L. Abaxial surface of rachis and pinna. M. Rachis hair. N. Adaxial surface of rachis and pinna. O.

SPECIMENS EXAMINED.—COLOMBIA. **Antioquia:** Mpio. Angelópolis, Vereda Romeral, sector Bocatoma, acueducto multiveredal, Quebrada Las Animas, 2100–2200 m, 6°09'29"N, 75°42'05"W, 29 Oct 2005, *Rodríguez et al.* 5559 (HUA).

Megalastrum pubescens is distinctive by laminae only 0.4–0.6 m long, abaxially densely and conspicuously pubescent, and adaxially between the veins glabrous. The pinnules tend to be slightly ascending.

Megalastrum pubescens resembles *M. vastum* but differs by laminae adaxially glabrous between the veins and longer hairs abaxially on the pinna rachises and costules (hairs 0.3–0.5 mm long, 2–4-celled vs. 0.1(–0.2) mm long, 1(–2)-celled). Also their scales on the pinna rachises abaxially differ subtly, with those of *M. pubescens* being brown, linear-lanceolate, and firmer, whereas those of *M. vastum* are golden brown, lanceolate, and flaccid.

37. *Megalastrum pubirhachis* R. C. Moran, J. Prado & Sundue, *sp. nov.* TYPE.—ECUADOR. Napo: El Chaco Cantón, just above N side of Río Oyachachi, where the Lago Agrio Road crosses the river, 00°18'S, 77°21'W, 1500 m, 9 Aug 1992, *A. Fay & L. Fay* 3919 (holotype: QCNE; isotypes: AAU!, MO! [04670566, 04670570, 04670656,], NY! [barcode 00870997], QCA?-n.v.). **Fig. 18E, 34F–L, 36A.**

Rhizomes unknown; **leaves** up to 2.0 m long; **petiole base scales** 10.0–15.0 mm long, linear, brown, shiny, smooth on both surfaces, spreading to loosely ascending, denticulate; **laminae** 0.4–1.5 m long, basally 3-pinnate-pinnatisect, medially 2-pinnate-pinnatisect; **basal pinnae** 30.0–45.0 cm long, inequilateral; **pinna rachises** abaxially eglandular, densely pubescent, scaly, the hairs (when present) 0.1–0.2 mm long, 2 or 3-celled, mostly retrorsely strigose, the scales 3.0–4.0 × ca. 0.1–0.2 mm, dull brown, appressed (mostly) to loosely spreading and ascending, filiform to linear, slightly tortuous, denticulate, adaxially pubescent, sparsely scaly or lacking scales, hairs like those abaxially, the scales like those abaxially; **basal basiscopic pinnules of medial pinnae** not enlarged or overlapping the lamina rachis; **costules** abaxially eglandular, pubescent, without scales or only sparsely scaly, the hairs ca. 0.1 mm long, 1- or 2-celled, acicular, ascending to strigose, the scales (when present) like those of the pinna rachises, adaxially pubescent, the hairs like those on the pinnae rachises adaxially; **laminar tissue between veins** abaxially eglandular, glabrous to sparsely puberulent, the hairs ca. 0.1 mm long, easily overlooked, erect, adaxially eglandular, glabrous; **ultimate veins** abaxially visible, glabrous to sparsely puberulent, the hairs ca. 0.1 mm long,

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Rachis scale. Scale bars = 1 mm. A–D: *Cornejo & Bonifaz* 5459 (AAU). F–K: *Jiménez & Huaylla* 2547 (UC). L–O: Lectotype, *Spruce* 4656 (K).

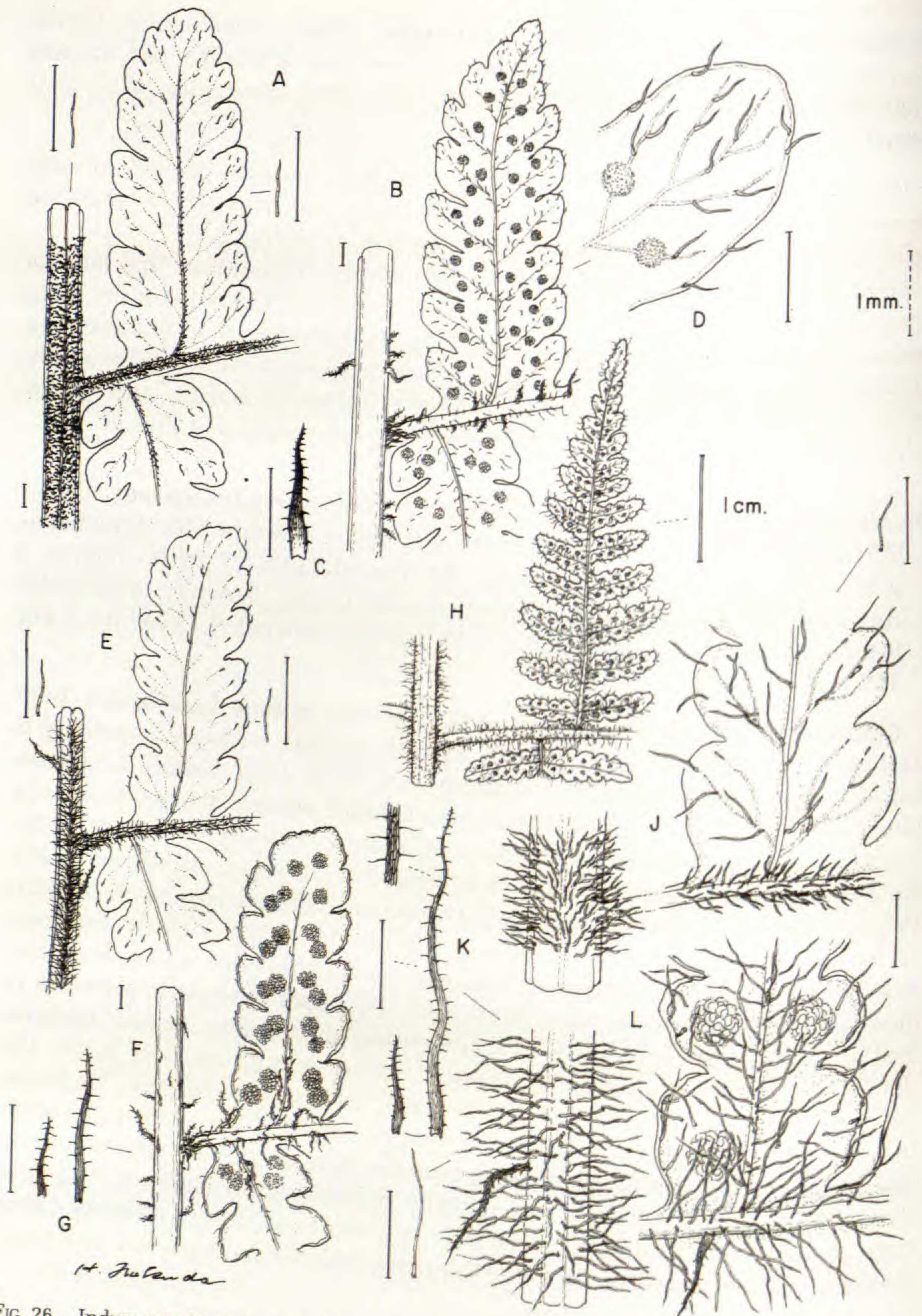


FIG. 26. Indument of two species of Andean *Megalastrum*. A-D. *M. fugaceum*. A. Adaxial surface of pinnule. B. Abaxial surface of pinnules. C. Scale from costule, note darkened apex. D. Abaxial surface of lobe. E-G. *M. fugaceum*. E. Adaxial surface of pinnules. F. Abaxial surface of pinnules. G. Scales from costule. H-L. *M. pulverulentum*. H. Abaxial surface of pinnules. J. Adaxial surface of costule and segment. K. Scales from pinna rachis. L. Abaxial surface of costule and segment.

acicular, adaxially obscure, glabrous; **lamina margins** eglandular, ciliate, the hairs 0.1–0.2 mm long, 1- or 2-celled, acicular, ascending to appressed; **indusia** absent; **spores** cristate.

Distribution.—Ecuador, Peru, eastern side of the Andes; 1300–2100 m.

SELECTED SPECIMENS EXAMINED.—ECUADOR. **Napo**: 65 km along rd. NE of Baeza, Cordillera Oriental, 1300 m, [0°05'S, 77°30'W], 26 Jan 1984, *Moran 3594* (B, MO, NY).

PERU. **Amazonas**: Bagua, 12 km E of La Peca, 1700 m, [5°36'S, 78°26'W], 20 Jun 1978, *Barbour 2394* (MO, NY).

Megalastrum pubirhachis is distinctive by pinna rachises abaxially with linear denticulate scales and dense, even, retrorsely strigose hairs. By these characters it resembles *M. reductum*, a species that differs by filiform scales and smaller (0.4–0.8 m long vs. 0.4–1.5 m in *M. pubirhachis*), less divided laminae (basally 2-pinnate-pinnatisect, medially 1-pinnate-pinnatisect to 2-pinnate-pinnatifid vs. basally 3-pinnate-pinnatisect, medially 2-pinnate-pinnatisect in *M. pubirhachis*). *Megalastrum pubirhachis* occurs only on the eastern side of the Andes, whereas *M. reductum* is only on the western side. The specific epithet refers to the dense hairs on the abaxial surfaces of the pinna rachises.

38. *Megalastrum pulverulentum* (Poir.) A. R. Sm. & R. C. Moran, Amer. Fern J. 77:129. 1987 [published 3 May 1988]. *Polypodium pulverulentum* Poir., Encycl. Méth. Bot. 5:555. 1804. *Aspidium lutescens* Willd., Sp. Pl. 5:272. 1810, *nomen superfl.* *Dryopteris pulverulenta* (Poir.) C. Chr. in Urb., Symb. Antill. 9:305. 1925. *Ctenitis pulverulenta* (Poir.) Copel., Gen. Fil. 124. 1947. LECTOTYPE.—designated by Proctor (1985): Plumier, *Traité Foug. Amér.* 27, pl. 34, 1707, illustrating a plant from Hispaniola. **Fig. 8C,E, 26H–L, 36B.**

Polypodium barbatum Desv., Mém. Soc. Linn. Paris 6:242. 1827. TYPE.—HISPANIOLA. Without exact locality, s.d., A. N. Desvaux s.n. (holotype: P! [barcode 00600637], photo US!).

Polypodium karstenianum Klotzsch, Linnaea 20:390. 1847. *Phegopteris karsteniana* (Klotzsch) Mett., Abh. Senck. Nat. Ges. Frankfurt 2:314. 1858. *Nephrodium villosum* (L.) Kuntze var. *karstenianum* (Klotzsch) Jenman, Bull. Bot. Dept. Jamaica n.s. 3:114. 1896. *Dryopteris subincisa* (Willd.) Urb. var. *karsteniana* (Klotzsch) C. Chr., Index Filic. 295. 1905. *Dryopteris karsteniana* (Klotzsch) Hieron., Hedwigia 46:348. 1907. *Ctenitis karsteniana* (Poir.) Vareschi, Fl. Venez. 1(1):405. 1969.

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Scale bars = 1 mm. A–D: Isotype, *Moran 5911* (UC); E–G: Isotype, *Øllgaard et al. 99556* (AAU). H–L: *Fay & Fay 3845* (NY).



FIG. 27. Leaf dissection in three species of *Megalastrum*. A. Lamina, *M. pleiosoros*. B. Proximal pinnae, *M. microsorum*. C. Proximal pinnae, *M. galapagense*. A: van der Werff 966 (S). B: Cornejo & Bonifaz 5459 (AAU). C: van der Werff 2256 (U).

Megalastrum karstenianum (Klotzsch) A. Rojas, Rev. Biol. Trop. 49:483. 2001. TYPE.—VENEZUELA [“as Colombien”]. Dec 1848, *H. Karsten II*, 3 (lectotype, designated by Moran and Prado, 2010: B! [barcode 200058400], photos B!, US!; isolectotypes: H-n.v.).

Phegopteris hirsuta Fée, Mém. Foug. 5:248. 1852. TYPE.—VENEZUELA [“Mexico”]. Mérida: Aug 1846, *H. Funck & L. J. Schlim* 975 (lectotype, designated by Moran and Prado, 2010: P [barcode 00600642]; isolectotypes, BM! [barcode 000907809], P! [barcode 00600643, 00600644], P [barcode 583962, 00583963]).

Aspidium erythrostemma Christ, Bull. Herb. Boiss., sér. 2, 4:961. 1904. *Dryopteris erythrostemma* (Christ) C. Chr., Index Filic. 263. 1905. TYPE.—COSTA RICA: in 1903, *C. Wercklé s.n.* (lectotype, designated by Moran and Prado, 2010: P! [barcode 00600398]).

Rhizomes erect, scales 20.0–40.0 × 0.3–0.5 cm, appressed to strongly ascending, linear-lanceolate, light brown to golden, twisted, lustrous, the margins denticulate; **leaves** up to 4.0 m long; **petiole base scales** like those of the rhizomes but spreading to loosely ascending; **laminae** 1.2–3.0 m long, basally 4-pinnate-pinnatisect, medially 3-pinnate-pinnatisect; **lamina rachises** pubescent abaxially; **basal pinnae** to 1.4 m long, strongly inequilateral; **pinna rachises** on both surfaces densely pubescent, scaly, glandular, the hairs 1.0–2.0 mm long, 5–12-celled, spreading, the scales denticulate to ciliate (the cilia often darker than the body of the scale, especially towards the apex), non-bullate, of two types, small ones ca. 0.2–0.6 × ca. 0.2 mm long, ovate to lanceolate, mostly appressed, the larger 3.0–8.0 × 0.2–0.5 mm long, linear to linear-lanceolate, spreading, the glands ca. 0.1 mm long, spherical, sessile, yellowish, adaxially with indument like that abaxially; **basal basiscopic pinnules of medial pinnae** not enlarged or overlapping the lamina rachis; **costules** abaxially glandular, densely pubescent, sparsely scaly, the indument like that on the pinna rachises but more sparsely scaly adaxially; **laminar tissue between veins** glandular and pubescent on both surfaces or only abaxially, the glands short-stalked to sessile and spherical, yellowish, the hairs 1.0–2.0 mm long, 5–8-celled, spreading to erect; **ultimate veins** on both surfaces visible to obscure, abaxially glandular, sparsely pubescent, non-scaly, the hairs ca. 0.5–2.0 mm long, 4–8-celled, adaxially eglandular, sparsely pubescent, the hairs 1.0–1.8 mm long, 4–9-celled, spreading; **lamina margins** glandular, ciliate, the hairs 0.4–1.0 mm long, 4- or 5-celled, spreading, the glands few, stalked, yellowish; **indusia** absent; **spores** echinulate.

Distribution.—Mexico, Guatemala, Honduras (Stolze, 1981), Costa Rica, Panama, Jamaica, Haiti, Dominican Republic, Guadeloupe, Martinique, St. Vincent, Dominica, Saba; Venezuela, Colombia, Ecuador, Peru; 1200–2500 (–3200) m (in West Indies from 0–1600 m; Moran *et al.*, 2009b).

SELECTED SPECIMENS EXAMINED.—VENEZUELA. **Aragua:** Colonia Tovar and vicinity, 2000–2100 m, [10°22'S, 67°16'W], 28 Dec 1921, *Pittier* 10029 (GH, NY, US). **Distrito Federal:** Carretera El Junquito-Colonia Tovar, [10°28'N, 67°05'W], 24 Oct 1963, *Agostini* 207 (NY). **Lara:** Morán, 8.7 mi SE of Sanare, in Parque Nacional Yacambu, 1500 m, 9°41'N, 69°35'W, 13 Nov 1982, *Smith et al.* 1249 (MO). **Mérida:** Dpto. Sucre, en las Selvas Nubladas situadas al norte de la localidad conocida como La Trampa, 2000 m, 9°34' N, 71°26' W, 2 Feb 1987, *Ortega et al.* 3030 (MO). **Trujillo:** Mpio. Boconó, entre las antenas de relevo en

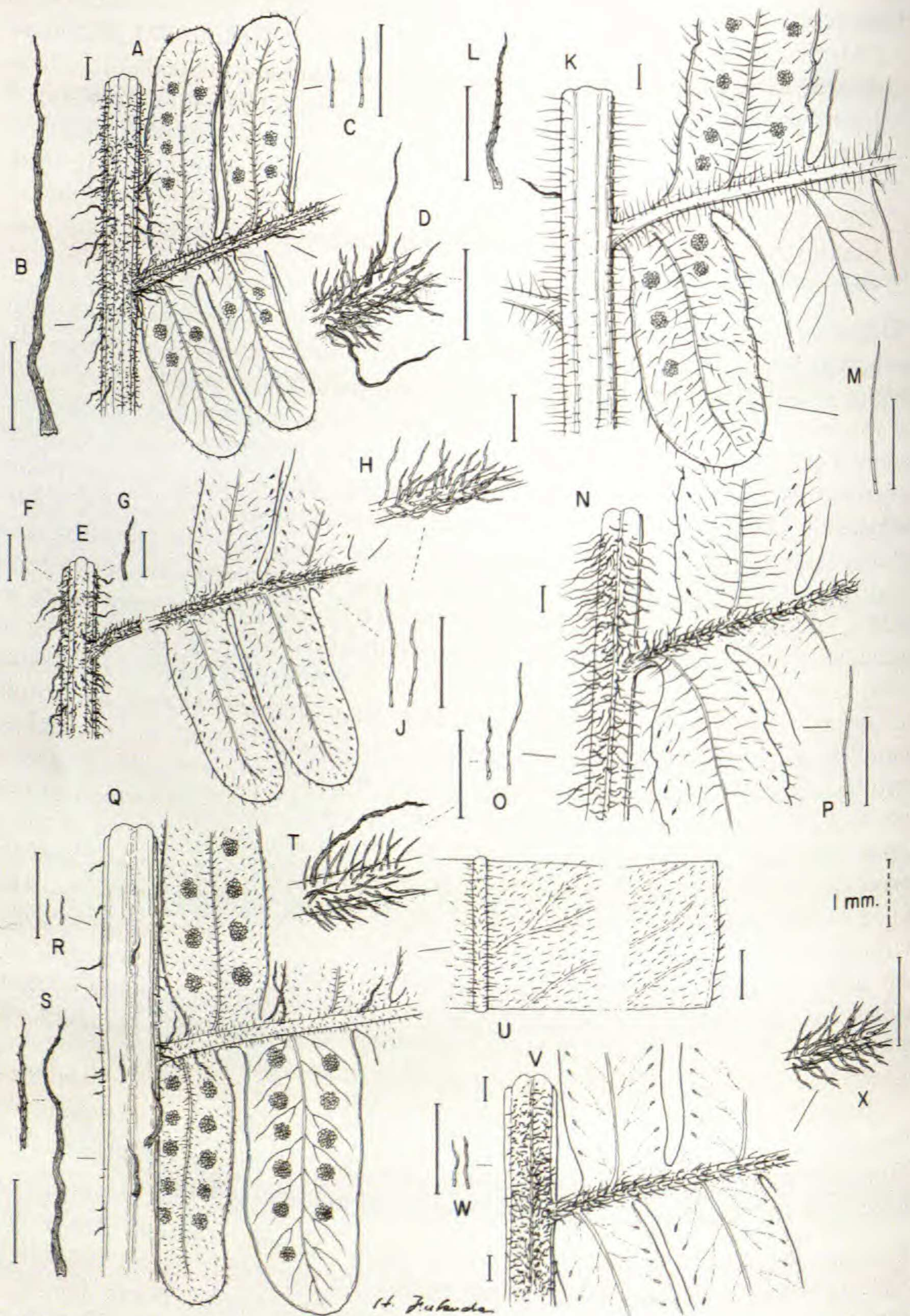


FIG. 28. Indument detail of three Andean species of *Megalastrum*. A–J. *M. pleiosoros*. A. Abaxial surface of rachis and pinna. B. Rachis scale. C. Detail of hairs. D. Costal hairs and scales. E. Adaxial surface of rachis and pinna. F. Rachis hair. G. Rachis scale. H. Hairs along costa. J. Detail of hairs. K–P. *M. hirsutosetosum*. K. Abaxial surface of rachis and pinna. L. Rachis scale. M. Hair from abaxial surface of lamina. N. Adaxial surface of rachis and pinna. O. Rachis hair. P. Hair from

el Páramo de Guaramacal y la Vega de Guaramacal, 1200–3200 m, [9°11'N, 70°12'W], 23–24 Jul 1984, *Ortega et al.* 2013 (MO, NY).

COLOMBIA. **Antioquia:** Jardín, Vereda Quebrada Bonita, sector Bocatoma, quebrada La Mendoza, 2110–2150 m, 5°35'04.3"N, 75°46'36.1"W, 7 Jan 2005, *Rodríguez et al.* 4915 (HUA, NY). **Cauca:** near Popayan, 1800 m, [2°26'N, 76°37'W], 14 Apr 1939, *Alston* 8026 (MO). **Cundinamarca:** Fusagasugá, m, [4°20'N, 74°22'W], s.d., *André* 91 (K, NY). **Magdalena:** Cordillera Oriental, Sierra de Perijá, 10 km ENE of Manaure, 46 km E of Valledupar, 3 km from Venezuela border, 2300 m, [10°28'N, 73°15'W], 4 Feb 1945, *Grant* 10810 (NY, US). **Norte de Santander:** Eastern Cordillera, Loso and vicinity, N of Toledo, 2200–2400 m, [7°17'N, 72°25'W], 6–7 Mar 1927, *Killip & Smith* 20411 (GH, NY, US). **Santander:** Río Suratá valley, above Suratá, 2000–2300 m, [7°30'N, 72°58'W], 5–6 Jan 1927, *Smith* 16659 (GR, NY, P, S, US).

ECUADOR. **Napo:** Quijos Cantón, within 5 km of the town of Baeza, 1900 m, 0°27'5"S, 77°53'00"W, 20 Jun 1992, *Fay & Fay* 3845 (AAU, MO, NY, QCNE). **Pichincha:** camino Santo Domingo de los Colorados a Alagoa, 2.5 km E of Cornejo Astorga, bosque primario por un río, Cordillera Central, 1200 m, [0°26'S, 78°47'W], 8 Jan 1984, *Moran* 3546 (F, MO, NY). **Without locality:** 1857–1859, *Spruce* 5257A (GH, K, NY, P, S).

PERU. **Cusco:** La Convención, Distr. Santa Ana, Madre Selva, 2100 m, 12°53'49"S, 72°45'02"W, 19 Mar 2004, *Valenzuela et al.* 3019 (MO).

Megalastrum pulverulentum is one of the largest species in the genus, with leaves to 4 m long and basal pinnae to 1.4 m long. Its laminae are densely pubescent on both surfaces by long (1–2 mm) whitish hairs. The pinna rachis scales are prominently toothed and darker apically. Yellowish glands are present on both surfaces and may be either sessile or short-stalked. It greatly resembles *M. fugaceum* (see discussion of *M. fugaceum* for comparison).

39. *Megalastrum reductum* A. Rojas, Mét. Ecol. Sist. 3(Supl. 1):45, fig. 6A–C. 2008. TYPE.—ECUADOR. Guayas/Cañar/Chimborazo/Bolívar: foothills of the W cordillera near the village of Bucay, [2°40'S, 79°40'W], 305–365 m, 8–15 Jun 1945, *W. H. Camp* 3786 (holotype: US-n.v.; isotypes: F! [accession 1409933], K!, MO! [barcode 1634138], NY! [barcode 0871594], P! [barcode 00568190]). **Fig. 5B, 21J–O, 29B.**

Megalastrum dorsiglabrum A. Rojas, Mét. Ecol. Sist. 3(Supl. 1):45, fig. 6A–C. 2008, as “*dorsoglabrum*”. TYPE.—PANAMA. **Coclé:** El Valle de Antón, [8°37'N, 80°07'W], 1000 m, 4 Jun 1934, *A. H. G. Alston* 8730 (holotype: CR!; isotypes: BM-n.v., US-n.v.).

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costule. Q–X. *M. microsorum*. Q. Abaxial surface of rachis and pinna. R. Rachis hairs. S. Rachis scale. T. Costule abaxially, hairs and scale. U. Detail of abaxial surface of lamina. V. Adaxial surface of rachis and pinna. W. Rachis hairs. X. Hairs along costa. Scale bars = 1 mm. A–J: *Adersen* 84 (C). K–P: *Moran & Rohrbach* 5160 (MO). Q–X: *Leiva et al.* 1759 (F).



FIG. 29. Leaf dissection in four species of Andean *Megalastrum*. A. *M. hirsutosetosum*. B. *M. reductum*. C. *M. polybotryoides*. D. *M. molle*. A: Øllgaard et al. 99268 (AAU). B: Panama, Moran 5060 (MO); C: Navarrete 539 (AAU). D: Isotype, van der Werff et al. 16300 (F).

Rhizomes erect to decumbent, up to 10.0 cm long, scales $10.0\text{--}20.0 \times 1.0\text{--}2.0$ mm, ascending, linear, golden brown, dull, firm, setulose on both the margins and surfaces; **leaves** up to 1.2 m long; **petiole base scales** like those of the rhizomes but spreading to loosely ascending; **laminae** 0.4–0.8 m long, basally 2-pinnate-pinnatisect, medially 1-pinnate-pinnatisect to 2-pinnate-pinnatifid; **lamina rachises** glabrous abaxially; **basal pinnae** 12.0–30.0(–40.0) cm long, equilateral or nearly so; **pinna rachises** abaxially eglandular, densely puberulent, scaly, the hairs (when present) 0.1–0.2 mm long, 1–3-celled, spreading to retrorsely strigose, the scales $3.0\text{--}4.0 \times \text{ca. } 0.1$ mm, dull brown, loosely spreading to ascending, filiform to linear, tortuous, entire, adaxially glabrous or pubescent, sparsely scaly or lacking scales, hairs like those abaxially, the scales $\text{ca. } 1.0 \times 0.1$ mm, dull, brown, filiform, entire, appressed; **basal basiscopic pinnules of medial pinnae** not enlarged or overlapping the lamina rachis; **costules** abaxially eglandular, sparsely puberulent or rarely glabrous, sparsely scaly or scales absent, the hairs $\text{ca. } 0.1$ mm long, 1- or 2-celled, acicular, ascending to strigose, the scales $\text{ca. } 0.5$ mm long, filiform, dull brown, entire, adaxially glabrous or subglabrous to sparsely pubescent, the

hairs like those on the pinnae rachises adaxially; **laminar tissue between veins** abaxially eglandular, glabrous to puberulent, the hairs ca. 0.1 mm long, 1- or 2-celled, acicular, erect, adaxially eglandular, glabrous; **ultimate veins** abaxially visible, sparsely puberulent with hairs like those on the costules, adaxially obscure, glabrous; **lamina margins** eglandular, ciliate, the hairs 0.1–0.2 mm long, 1- or 2-celled, acicular, ascending to substrigose; **indusia** absent; **spores** cristate.

Distribution.—Eastern Panama, Colombia and Ecuador, western side of Andes; 300–1000 m.

SELECTED SPECIMENS EXAMINED.—COLOMBIA. **Antioquia**: Mpio. Frontino, Parque Nacional Natural Las Orquídeas, vereda Venados Abajo, camino de la cabaña de Venados a la vereda Alto Bonito, 900–920 m, 6°32'10"N, 76°19'15"W, 24 Jul 2011, *Sanín et al.* 5176 (NY). **Caldas**: Santa Cecilia, Cordillera Occidental, Fatamá, vertiente occidental, 800 m, 5°03'S, 75°39'W, 25 Nov 1945, *von Sneider* 5024 (F).

ECUADOR. **Bolívar**: San Miguel, within 3 km of Balzapamba, 800 m, 1°47'S, 79°10'W, 10 Jul 1995, *Fay & Fay* 4626 (MO, QCNE). **Cotopaxi**: Cacaoal, 300 m, [1°01'S, 79°12'W], 6 May 1951, *Bell* 920 (BM, S). **El Oro**: 10.6 millas E de Saracay hacia Piñas, 700 m, [3°37'S, 79°55'W], 23 Nov–18 Dec 1978, *Albert de Escobar* 943 (NY). **Esmeraldas**: Quininde, Bilsa Biological Station, Montañas de Mache, 35 km W of Quininde, 5 km W of Santa Isabela, 400–600 m, 0°21'N, 79°44'W, 10 Dec 1994, *Pitman & Bass* 1073 (MO, QCNE). **Los Ríos**: Río Palenque Estacion Biológica, Km 56 al norte de Quevado, 150–220 m, [1°22'S, 79°42'W], 29 Jan 1984, *Moran* 3609 (F, NY, QCA, US). **Manabi**: Cantón Pedernales, Cerro Pata de Pájaro a 10 km al este de Pedernales, a 5 km del rancho de la familia Arroyo, 800 m, 00°01'N, 079°57'W, 10 Mar 1997, *Vargas* 1295 (MO, QCNE). **Pichincha**: Hotel Tinalandia, casi 25 km al este desde Sto. Domingo de los Colorados, Cordillera Occidental, 1000 m, [0°17'23"S, 79°04'06"W], 8 Jan 1984, *Moran* 3543 (MO, NY, QCA).

Megalastrum reductum is distinctive by the combination of leaf dissection and indument. The leaves are medium-sized, up to only 1.2 m long, with the basal pinnae equilateral or nearly so, not prolonged on the basiscopic side as in many other species of *Megalastrum*. The first two proximal pinnules are often slightly reduced (thus the specific epithet), and apices of the pinnules are typically obtuse or broadly acute. The pinnules are mostly adnate and appear short and stubby. The abaxial surfaces of the pinna rachises are evenly puberulent with hairs 0.1–0.2 mm long, 1- or 2-celled, and spreading to retrorsely strigose. The scales on the pinna rachises abaxially are scattered, dark, filiform to linear, and slightly tortuous. Shorter hairs (ca. 0.1 mm long) occur abaxially on the costules and sometimes along the veins, and in some specimens short erect acicular hairs (these easily overlooked) occur on the lamina tissue between the veins. The rhizome scales appear setulose on both surfaces, this apparently from the upturned and projecting ends of the cells.

Some specimens have pinna rachises adaxially glabrous, and these have been named *Megalastrum dorsiglabrum* A. Rojas (Rojas 2008). We place *M.*

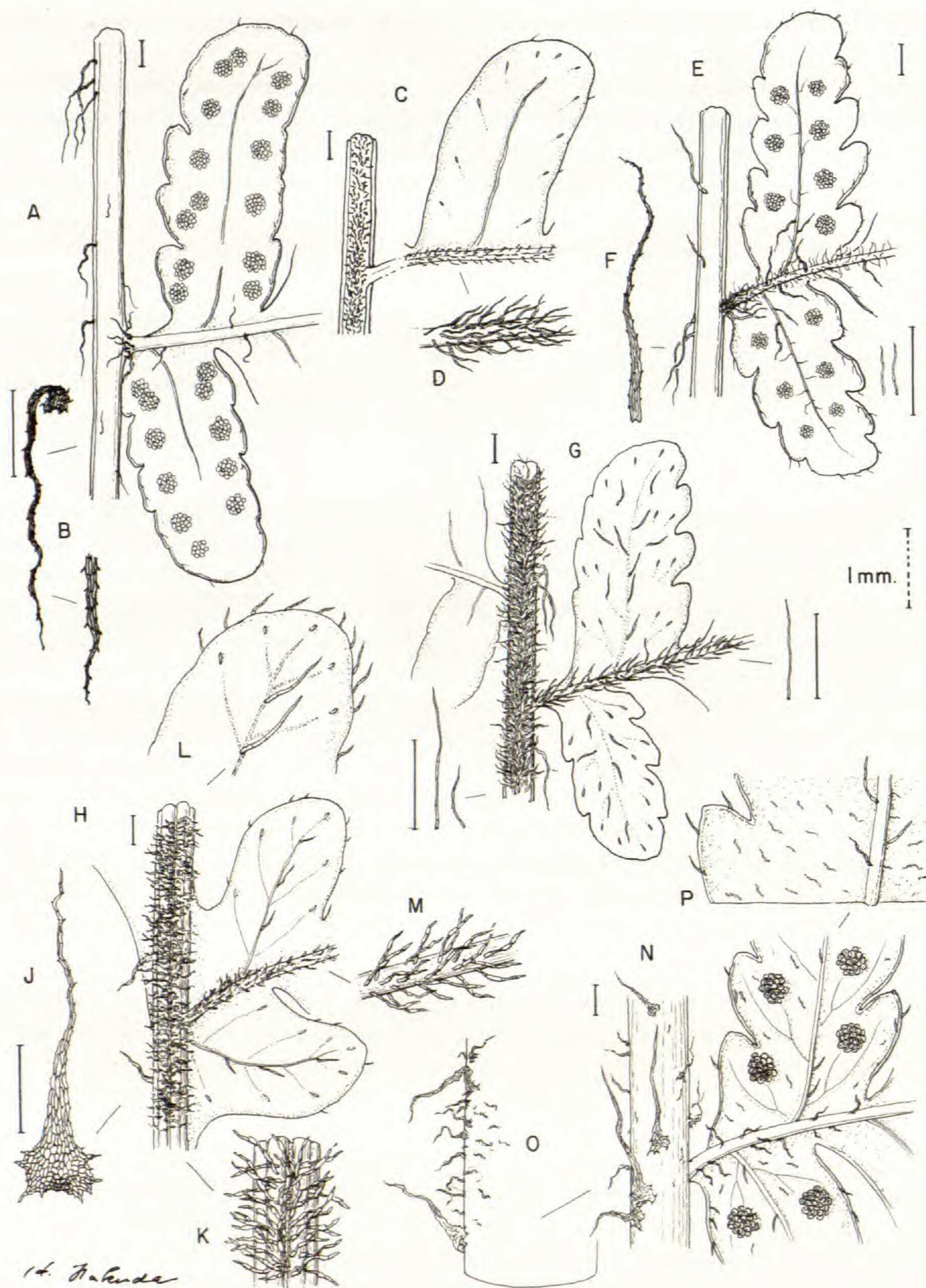


FIG. 30. Indument detail of three Andean species of *Megalastrum*. A–D. *M. martinicense*. A. Abaxial surface of rachis and pinna. B. Rachis scales. C. Adaxial surface of lamina rachis and pinna. D. Detail of pinna rachis. E–G. *M. tepuiense*. E. Abaxial surface of lamina rachis and pinnules. F. Rachis scale. G. Adaxial surface of lamina rachis and pinnules. H–P. *M. subincisum* H. Adaxial surface of pinna rachis and pinnule. J. Scale from pinna rachis. K. Detail of pinna rachis. L.

dorsiglabrum in synonymy because no other character appears to correlate with the lack of hairs adaxially on the pinna rachises.

Megalastrum vastum is similar by its short even pubescence on the laminae abaxially; however, it differs by larger, more divided laminae (up to 3-pinnate-pinnatisect), linear lanceolate (vs. filiform) scales on the pinna rachises abaxially, and laminar tissue between the veins pubescent adaxially especially toward the margins.

Megalastrum biseriale is similar but differs by inequilateral basal pinnae (at least in large leaves), scallier leaf axes abaxially, and pinna rachises abaxially with longer hairs (0.4–0.6 mm long, 3- or 4-celled) and wider, more lanceolate scales.

See *Megalastrum pubirhachis* for comparison with that species.

40. *Megalastrum rhachisquamatum* R. C. Moran, J. Prado & Sundue, *sp. nov.*

TYPE.—ECUADOR. Napo: Cantón El Chaco, Proyecto Hidroeléctrico Coca, Punto ST3, margen derecha del Río Quijos, ca. 10 km S de Reventador, 00°39'S, 77°39'W, 1500 m, 3–5 Oct 1990, W. Palacios 5844 (holotype: QCNE!; isotypes: MO! [barcode 4062147, 4062148], NY! [barcode 0871596], QCA?-n.v., UC! [barcode 1593127]). **Figs. 7H–L, 22D, 36C.**

Rhizomes erect; **leaves** 1.0–1.2 m long; **petiole base scales** ca. 15.0 × 2.0 mm, brown, flat, ascending to spreading, sparsely denticulate, sometimes with denticulae on the surface; **laminae** 0.7–0.8 m long, 3-pinnate-pinnatisect at base, 2-pinnate-pinnatisect medially; **lamina rachises** pubescent abaxially, densely and conspicuously scaly; **basal pinnae** up to 27.0 cm long, inequilateral, longer basiscopically; **pinna rachises** on both surfaces very sparsely glandular, densely pubescent, densely and conspicuously scaly, the hairs 0.4–0.5 mm long, 4–6-celled, lax, spreading, the scales 5.0–7.0 × 1.0–2.0 mm, brown, lanceolate with conspicuously narrowed base (the point of attachment thickened), spreading, flat, lustrous, denticulate, adaxially eglandular, densely pubescent, scaly, the hairs 1.0–1.5 mm long, 5–8-celled, spreading, lax, scales like those on the abaxial surfaces; **costules** abaxially glandular, pubescent, scaly, the glands stalked, orangish, the hairs and scales like those of the pinna rachises abaxially, adaxially eglandular, pubescent, sparsely scaly, the hairs 1.0–1.5 mm long, 5–8-celled, spreading, lax, the scales like those abaxially; **laminar tissue between veins** abaxially glandular, pubescent, the glands 0.1–0.2 mm long, 2-celled, stipitate, yellowish, erect, the hairs ca. 0.1 mm long, 1- or 2-celled, erect, acicular, adaxially sparsely glandular, pubescent, the glands like those abaxially, the hairs 0.3–0.4 mm long, 2- or 3-celled, lax, spreading to appressed; **ultimate veins** not visible on

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Segment apex. M. Hairs along costule. N. Abaxial surface of pinna rachis and pinnule. O. Detail of hairs and scales on pinna rachis. P. Detail of adaxial surface. Scale bars = 1 mm. A–D: Isolectotype, Moritz 202 p.p. (F). E–G: Isotype, Steyermark 85913 (US). H–P: from Jamaica, Clute 132 (US).

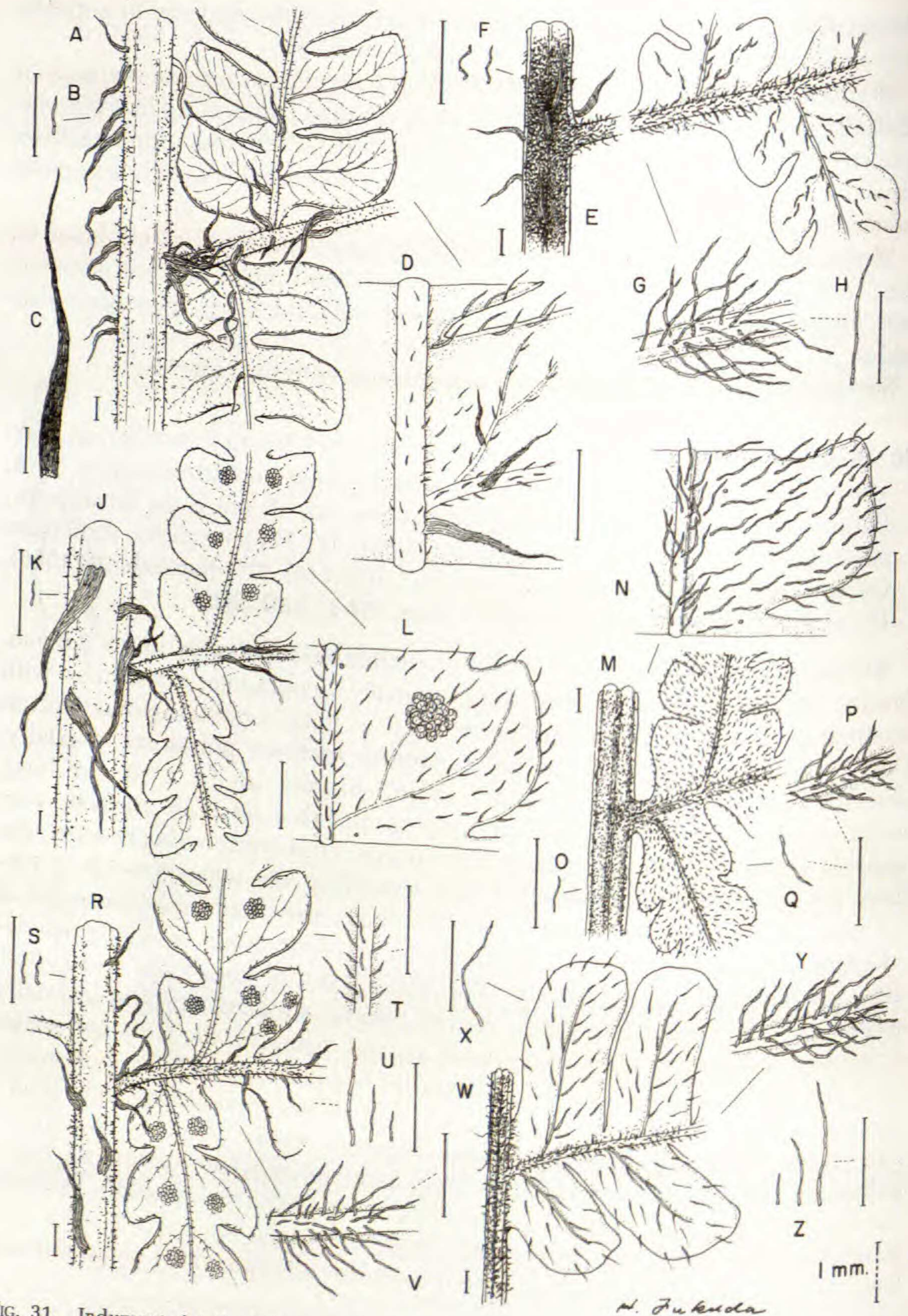


FIG. 31. Indument detail of three Andean species of *Megalastrum*. A–H. *M. peruvianum*. A. Abaxial surface of rachis and pinna. B. Rachis hairs. C. Rachis scale. D. Abaxial surface of costules. E. Adaxial surface of rachis and pinnule. F. Rachis hair. G. Adaxial surface of pinna. H. Hair. J–Q. *M. mollicoma*. J. Abaxial surface of rachis and pinna. K. Rachis hair. L. Abaxial surface of costule, veins, and lamina tissue. M. Adaxial surface of rachis and pinna. O. Rachis hair.

both surfaces, abaxially sparsely glandular, pubescent, the glands like those from the laminar tissue, the hairs 0.2–0.1 mm long, 2- or 3-celled, lax, spreading, adaxially like the abaxial side but hairs 0.7–1.2 mm long, 3–7-celled, spreading to appressed; **lamina margins** eglandular, densely ciliate, the hairs 0.3–0.5 mm long, 3–5-celled, ascending to spreading; **indusia** absent; **spores** cristate.

Distribution.—Ecuador, Peru; 1350–2300 m.

SELECTED SPECIMENS EXAMINED.—ECUADOR. **Zamora-Chinchipe**: Cordillera del Condor, Chinapintza, trail leading to Destacamento Mayaycu Alto, 1350–1480 m, 4°03'S, 78°35'W, 6 Dec 1990, Øllgaard 98413 (AAU); vic. of the mining camp at the Río Tundaime, along road to military base El Condor, 1500 m, 3°38'02"S, 78°25'32"W, 6 Nov 2004, *van der Werff* 19383 (QCNE, UC).

PERU. **Cusco**: La Convención, above Qillouno, 2300 m, 12°28'35"S, 72°29'15"W, 29 Apr 2006, *van der Werff* 21116 (MO, NY).

Megalastrum rhachisquamatum has petioles and rachises densely and conspicuously scaly (thus the specific epithet), the scales 1–2 mm wide and spreading. Also helpful in identification are the laminae 3-pinnate-pinnatisect at base and tissue between the veins pubescent on both surfaces. The pubescence adaxially is distinctive by the hairs between the veins being shorter (0.3–0.4 mm long) than those along the veins and midribs of the ultimate segments (0.7–1.2 mm long). This species resembles *M. mollicoma*, a species that differs by shorter, slightly tortuous, and appressed-ascending hairs adaxially on and between the veins.

41. *Megalastrum rupicola* M. Kessler & A. R. Sm., Amer. Fern J. 96:41, fig. 2D–F. 2006. TYPE.—BOLIVIA. La Paz: Prov. Nor Yungas, Estación Biológica de Tunquini, Bajo Hornuni, senda del campo de Don Pedro al camino de la mina, 16°12'S, 67°53'W, 21 Jul 2000, *D. Quintana* 41 (holotype: UC! [barcode 1749582]; isotypes: GOET!, LPB-n.v.). **Figs. 12A–C, 13E, 36B.**

Rhizomes erect, scales 5.0–10.0 × 0.5–0.8 mm, ascending to appressed, linear-lanceolate, golden brown, lustrous, twisted, denticulate; **leaves** 0.6–1.2 m long; **petiole base scales** like those of the rhizomes but spreading to loosely ascending; **laminae** 0.4–0.5 m long, basally 2-pinnate-pinnatisect or rarely 3-pinnate-pinnatisect, medially 1-pinnate-pinnatisect; **lamina rachises** without hairs abaxially; **basal pinnae** 15.0–30.0 cm long, inequilateral, elongated basiscopically; **pinna rachises** abaxially eglandular, without hairs or (more rarely) pubescent basally, scaly, the hairs (when present) 0.2–0.3 mm

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P. Hairs on costule. Q. Hair from costule. R–Z. *M. miscellum*. R. Abaxial surface of rachis and pinna. S. Rachis hairs. T. Hairs on costule. U. Hairs from pinna rachis. V. Hairs on pinna rachis. W. Adaxial surface of pinna rachis, costules, and segments. X. Hair from adaxial surface of vein. Y. Hairs along costule. Z. Hairs from costule. Scale bars = 1 mm. A–H: Kessler et al. 7033 (UC). J–Q: Rodríguez et al. 4805 (NY). R–Z: Arbeláez et al. 276 (NY).

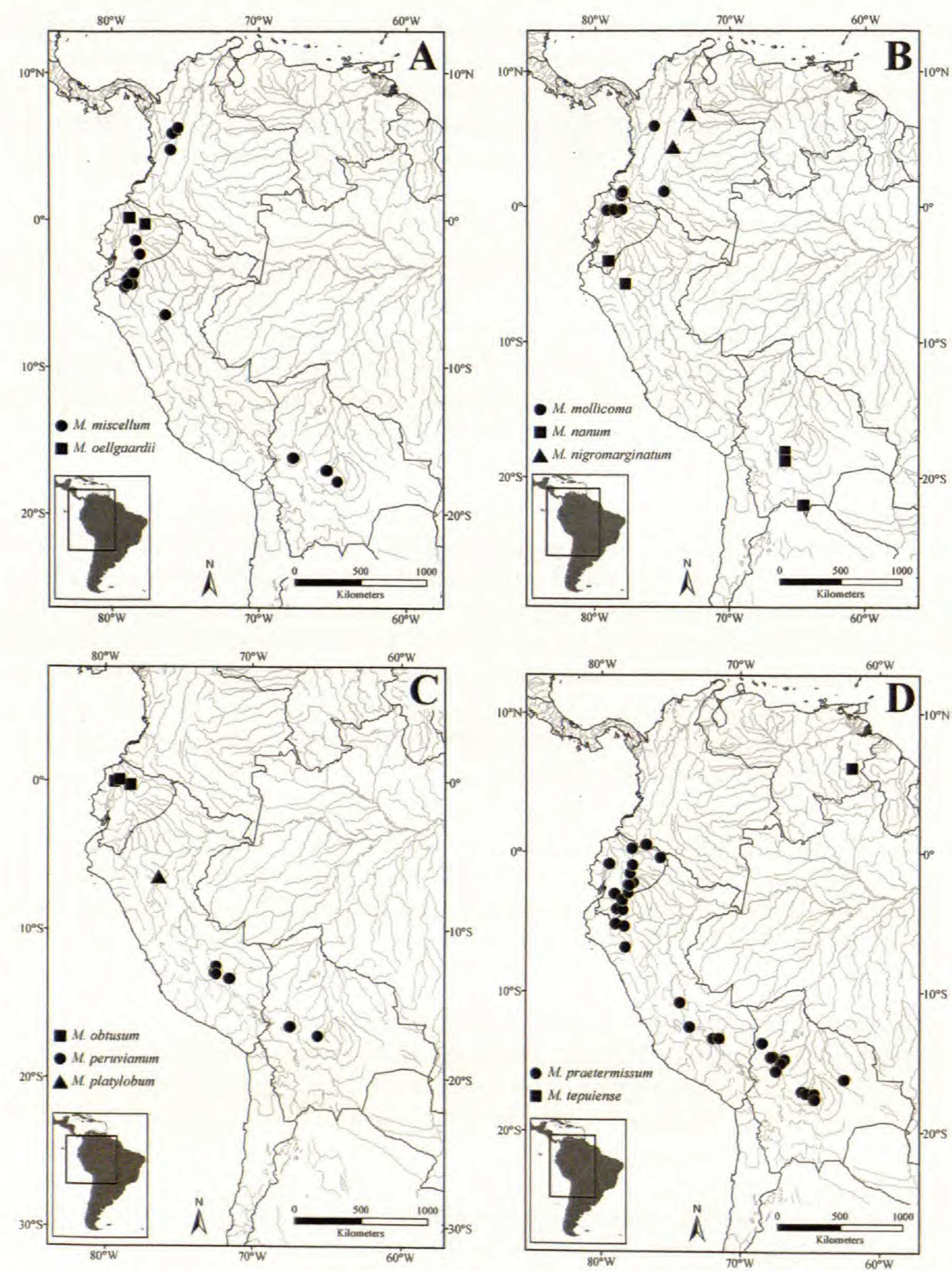


FIG. 32. Distribution of ten species of *Megalastrum* in the Andes. Some species are also known from areas outside the Andean region as here defined; for the worldwide distribution of a species, see under each species description.

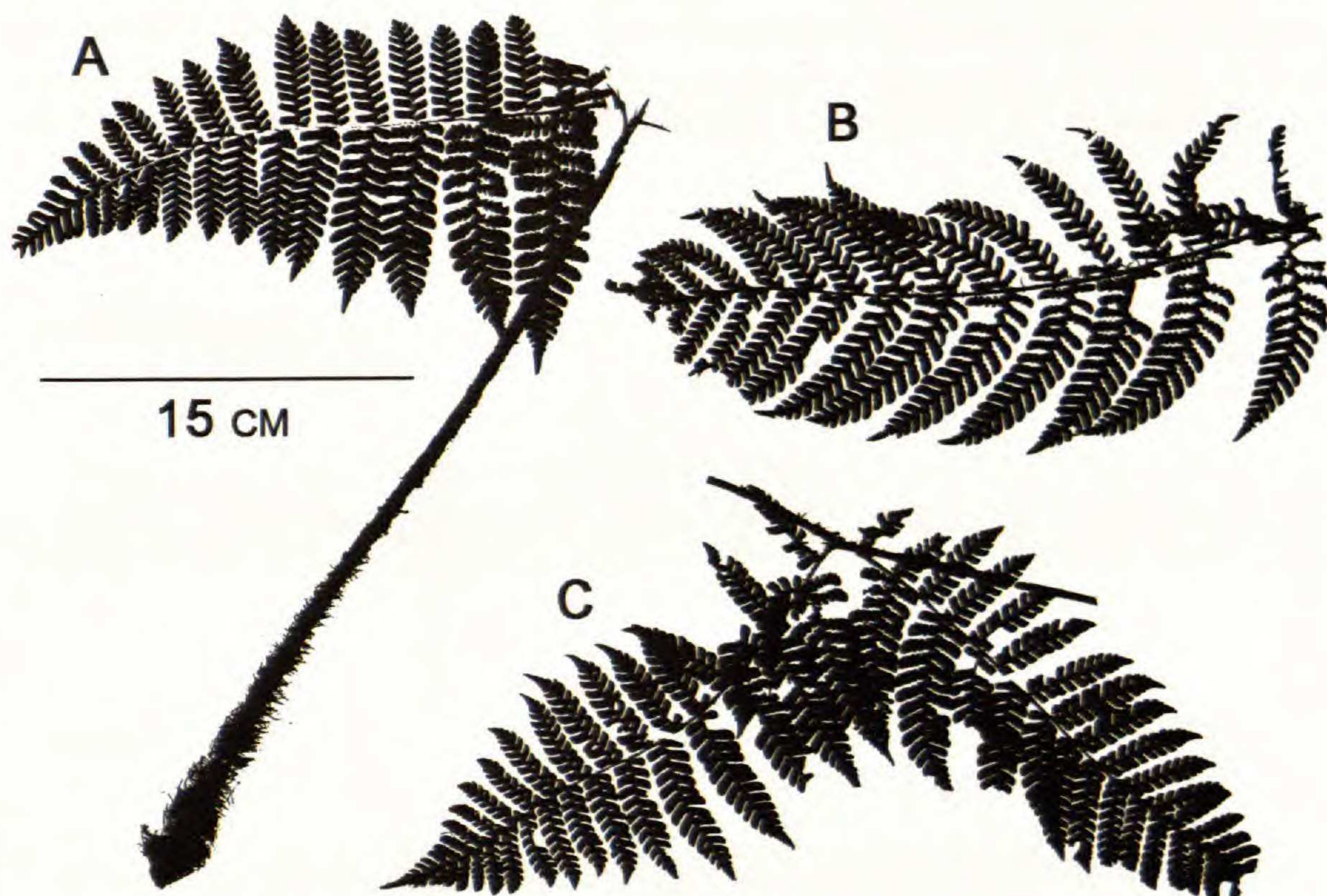
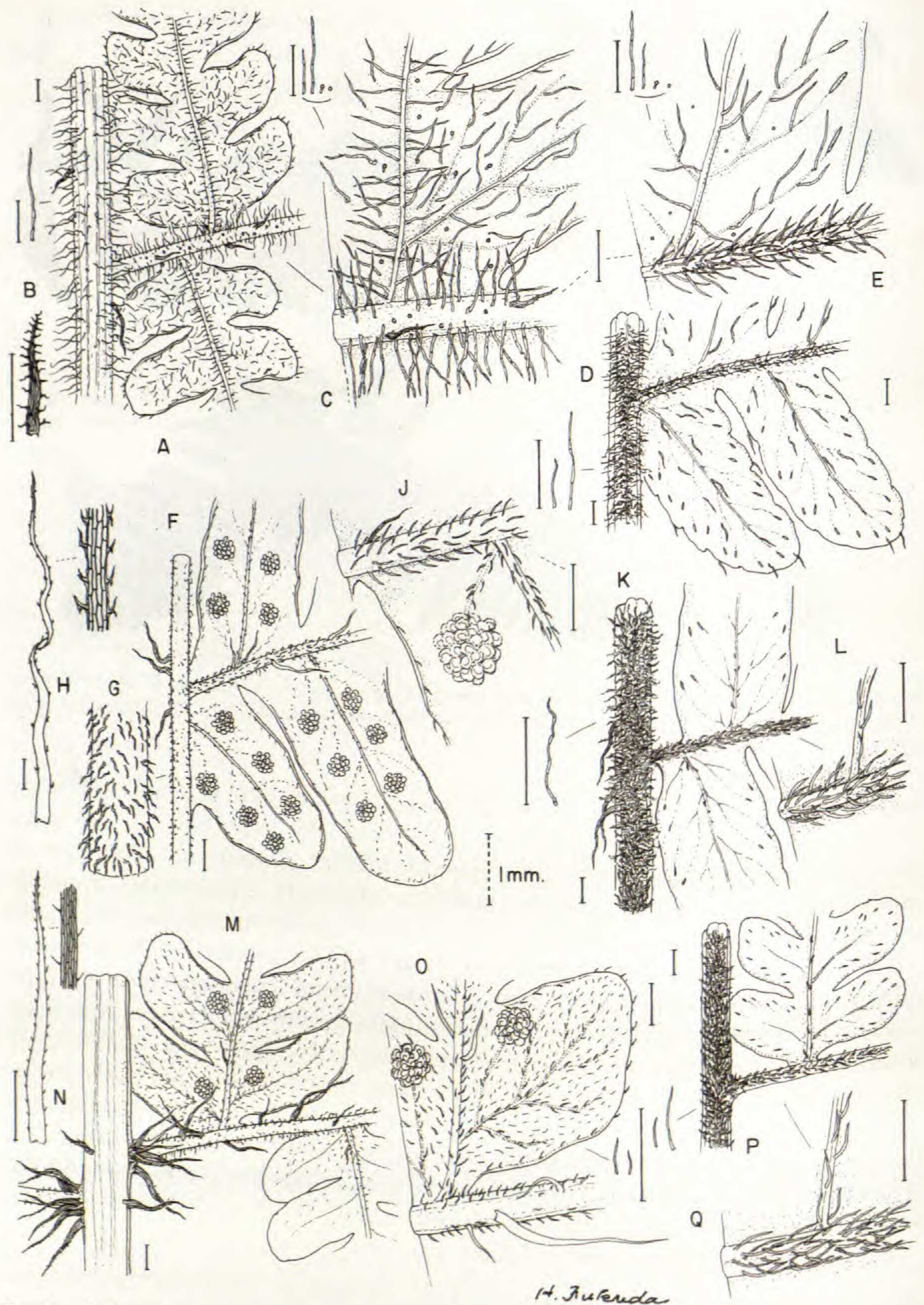


FIG. 33. Lamina cutting of three species of Andean *Megalastrum*. A. *M. vastum*. B. *M. mollicoma*. C. *M. peruvianum*. A: Cuatrecasas 13021 (GH). B: Isolectotype, Sodiro s.n. (B). C: Kessler et al. 7033 (UC).

long, 1- or 2-celled, erect, acicular, the scales $2.0\text{--}4.0 \times \text{ca. } 0.5 \text{ mm}$, like those of the petioles, adaxially eglandular, pubescent, the hairs $0.8\text{--}1.2 \text{ mm}$ long, 5–7-celled; **basal basiscopic pinnules of medial pinnae** not enlarged or overlapping the lamina rachis; **costules** abaxially eglandular, sparsely pubescent, sparsely scaly, the hairs like those of the pinna rachises, the scales $1.0\text{--}2.5 \times \text{ca. } 0.3 \text{ mm}$, like those of the pinna rachises, adaxially like the pinna rachises abaxially but scales absent; **laminar tissue between veins** on both surfaces eglandular, glabrous or pubescent with minute hairs $\text{ca. } 0.1 \text{ mm}$ long; **ultimate veins** visible on both surfaces, abaxially eglandular, glabrous to sparsely pubescent, the hairs $0.3\text{--}0.4 \text{ mm}$ long, 2- or 3-celled, like those on the pinna rachises abaxially, adaxially eglandular, glabrous or pubescent, the hairs (when present) $0.8\text{--}1.2 \text{ mm}$ long, 3–6-celled; **lamina margins** eglandular, sparsely ciliate, the hairs $0.1\text{--}0.3 \text{ mm}$ long, 2- or 3-celled, acicular, substrigose, ascending; **indusia** absent; **spores** cristate.

Distribution.—Bolivia; 100–1900 m.

SELECTED SPECIMENS EXAMINED.—BOLIVIA. **Carrasco**: Cochabamba, Parque Nacional Carrasco, Arepucho, 1050 m, $17^{\circ}22'09''\text{S}$, $65^{\circ}14'01''\text{W}$, 23 Oct 2000, Zarate & Muriel 779 (NY). **Cochabamba**: Prov. Chapare, Territorio Indígena Parque Nacional Isiboro-Secure, Cordiller de Mosetenez, Laguna Carachupa, 1300 m, $16^{\circ}14'\text{S}$, $66^{\circ}25'\text{W}$, 29 Aug 2003, Kessler et al. 12950 (GOET, UC). **La Paz**: Parque Nacional Madidi, Fuertecillo, entre Tokoake y Carjata, 1739 m,



14. *Fulvenda*

FIG. 34. Indument of three species of Andean *Megalastrum*. A-E. *M. nanum*. A. Abaxial surface of pinna rachis and pinnules. B. Rachis scale. C. Abaxial surface showing hairs and glands. D. Adaxial surface of pinna rachis and pinnule. E. Adaxial surface of segment. F-L. *M. pubirhachis*. F. Abaxial surface of pinna rachis and pinnules. G. Pinna rachis. H. Rachis scale and detail of bifid teeth. J. Hairs on costule and vein. K. Adaxial surface of pinna rachis and pinnules. L. Hair from

14°35'52"S, 68°55'46"W, 29 Jun 2005, *Fuentes et al.* 9034 (MO, NY); Prov. J. Bautista Saavedra M., Pauji-Yuyo, entre Apolo y Charazani, 1450 m, 15°02'S, 68°29'W, 8 Jun 1997, *Kessler* 9900 (UC).

Megalastrum rupicola is characterized by pinna rachises abaxially without hairs, pinna rachis scales lanceolate, brown to golden brown, shiny, and veins adaxially glabrous or subglabrous. The species most resembles *M. marginatum*, which differs by laminae pubescent with long, straightish, white hairs.

42. *Megalastrum squamosissimum* (Sodirol) A. R. Sm. & R. C. Moran, Amer. Fern J. 77:129. 1987 [published 3 May 1988]. *Nephrodium squamosissimum* Sodirol, Crypt. Vasc. Quit. 256. 1893. *Dryopteris squamosissima* (Sodirol) C. Chr., Index Filic. 294. 1905. *Ctenitis squamosissima* (Sodirol) Copel., Gen. Fil. 125. 1947. TYPE.—ECUADOR. Chimborazo: Mt. Tungurahua, [1°28'S, 78°26'W], Dec. 1857, R. Spruce 5262 (neotype, here designated: BM! [barcode 000907806]; isoneotypes: BM! [barcode 000777142, (fragm.) 000890191], GH!, K! [barcode 000200216], NY! [barcode 00871582], P! [barcode 00600375, 00610642]). **Figs. 12 D–F, 18A, 36C.**

Dryopteris subincisa (Willd.) Urb. var. *bogotensis* Hieron., Hedwigia 46:349. 1907. *Dryopteris squamosissima* (Sodirol) C. Chr. var. *bogotensis* (Hieron.) C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math Afd., ser. 8, 6:75. 1920. *Megalastrum squamosissimum* (Sodirol) A. R. Sm. & R. C. Moran var. *bogotense* (Hieron.) A. R. Sm. & R. C. Moran, Amer. Fern J. 77:129. 1987 [published 3 May 1988]. TYPE.—COLOMBIA. Cundina marca: near the city of Bogotá, [4°35'S, 74°04'W], s.d., M. A. Stübel 418 (lectotype, here designated: BM!, fragm. [barcode 000907805]).

Rhizomes erect, sometimes forming a trunk up to 0.5 m tall, scales 15.0–20.0 × 0.5–2.0 mm, brown, ascending to appressed, lanceolate, lustrous, flat, not tortuous, denticulate, the teeth not bifid; **leaves** 1.5–3.0 m long; **petiole base scales** like those of the rhizomes but spreading to loosely ascending; **laminae** 1.2–2.1 m long, basally 3-pinnate-pinnatifid, medially 2-pinnate-pinnatifid; **lamina rachises** without hairs abaxially; **basal pinnae** 30.0–50.0 cm long, inequilateral; **pinna rachises** abaxially eglandular, without hairs (often with highly reduced scales that resemble hairs, or hair-like cilia from large scales), scaly, the scales 5.0–12.0 × 0.5–2.0 mm, spreading to ascending or appressed, lanceolate to linear-lanceolate, golden to pale light brown, lustrous, often ciliate basally but otherwise entire or subentire for most of the length, adaxially eglandular, densely pubescent, sparsely scaly, the hairs 0.8–1.0 mm

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costule. M–Q. *M. nigromarginatum*. M. Abaxial surface of pinna rachis, costule, and pinnules. N. Rachis scale. O. Abaxial surface of costule and segment. P. Adaxial surface of pinna rachis, costule, and segments. Q. Adaxial surface of costule. Scale bars = 1 mm. A–E: Isotype, *Moran* 5917 (AAU). F–L: *Moran* 3594 (MO). M–Q: Holotype, *Tryon & Tryon* 6103 (GH).

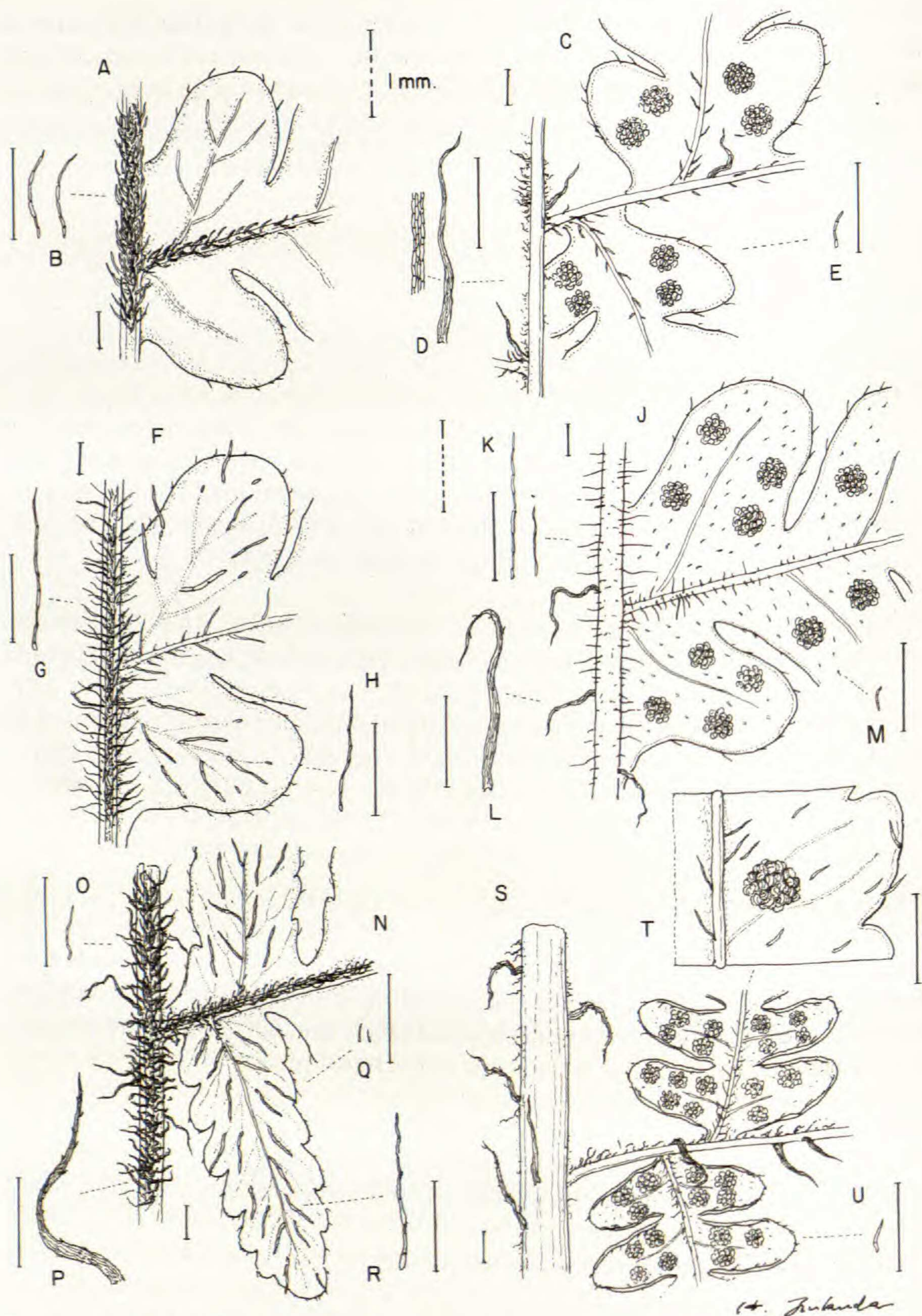


FIG. 35. Indument detail of three Andean species of *Megalastrum*. A–E. *M. obtusum*. A. Adaxial surface of pinna rachis, costule, and segments. B. Hair detail. C. Abaxial surface of lamina rachis, pinna rachis, and pinnules. D. Scale detail. E. Hair detail. F–M. *M. praetermissum*. F. Adaxial surface of pinna rachis, costule, and veins. G, H. Hair details. J. Abaxial surface of pinna rachis and pinnule base. K. Hair detail. L. Scale detail. M. Hair detail. O–U. *M. subtile*. N. Adaxial surface of

long, 4–6-celled, antrorsely strigose, scales like those on the abaxial surfaces; **basal basiscopic pinnules of medial pinnae** not enlarged or overlapping the lamina rachis; **costules** abaxially eglandular, glabrous or pubescent, sparsely scaly, hairs (when present) ca. 0.2 mm long, 2-celled, acicular, scales $0.6\text{--}3.5 \times 0.3\text{--}0.5$, appressed, ascending, lanceolate, entire, adaxially eglandular, sparsely to moderately pubescent, scales generally absent, the hairs 0.4–1.0 mm long, 4–6-celled, antrorsely strigose; **laminar tissue between veins** on both surfaces eglandular, glabrous, or rarely with scattered erect acicular hairs ca. 0.1 mm long; **ultimate veins** on both surfaces visible or sometimes obscure adaxially, glabrous; **lamina margins** eglandular, ciliate, the hairs 0.2–0.3 mm long, 1- or 2-celled, ascending to spreading; **indusia** absent; **spores** cristate.

Distribution.—Venezuela, Colombia, Ecuador; 1400–2800 m.

SELECTED SPECIMENS EXAMINED.—VENEZUELA. **Yaracuy:** Distr. Bolívar, entre Las Parchitas, Tierra Fria y Ojo de Agua, 1500–1600 m, 10°20'N, 68°57'W, 18 Feb 1985, *Ortega & Smith* 2476 (UC).

Feb 1985, *Ortega & Smith* 2476 (UC).
 COLOMBIA. **Antioquia:** Cocorná, [6°03'N, 75°11'W], Dec 1937, *Daniel* 1898 (GH). **Boyaca:** Sierra Nevada del Cocuy, Near trail between Bocota and Bachira, in primary forest, in soil of forest floor, 2250 m, [6°26'N, 72°17'W], 25 Sep 1957, *Grubb & Guymer* 94 (BM). **Cundinamarca:** Manyanos, 2700 m, [4°41'N, 74°09'W], s.d., *Lindig* 331 (NY, P, US); road from Bogotá to Sylvania, 20 km S of Bogotá, [4°35'N, 74°04'W], 22 Jul 1972, *Barrington* 461 (GH, MO, US). **Magdalena:** Mpio. de Ciénaga, Sierra Nevada de Santa Marta, subiendo por San Pedro de la Sierra, entrada a San Javier, [10°52'N, 73°43'W], 10 May 1983, *Santa & Escobar* 642 (HUA). **Santander:** Mpio. Tona, Corregimiento Corcova, Vereda Las Mariana, along highway between Pamplona and Bucaramanga, 2220 m, 7°07'N, 73°06'W, 5 May 1983, *Croat* 56541 (MO, UC).
 Ecuador. **El Oro:** Ambato, [1°14'S, 78°37'W], 24–26 Aug

ECUADOR. **Tungurahua**: vic. of Ambato, [$1^{\circ}14'S$, $78^{\circ}37'W$], 24–26 Aug 1918, *Rose* 22379 (NY, US).

Among the large decompound species of *Megalastrum*, *M. squamosissimum* is characterized by pinna rachises abaxially without hairs but with abundant large (5–12 mm long) lanceolate scales. The scales are conspicuous to the naked eye, especially along the rachises of the laminae and pinnae. Sometimes smaller scales resembling scurf-like hairs are present along the rachises. The long cilia from the bases of large scales accentuate this scurf-like appearance. Two specimens (*Daniel 1898, Ortega & Smith 2476*) are atypical by having acicular, erect, 0.1 mm long hairs between the veins abaxially.

Similar is *Megalastrum alticola*, which differs by pinna rachises abaxially pubescent and smaller scales along the pinna rachises abaxially.

pinna rachis, costule, and veins. O. Hair detail. P. Scale detail. Q, R. Hair details. S. Abaxial surface of pinna rachis, costule, and veins. T. Detail of abaxial surface of pinnule. U. Hair detail. Scale bars = 1 mm. A-E: *Sparre 17168* (MO). F-M: Isotype, *Fay & Fay 4250* (UC). O-U: Isotype, *Moran et al. 7608* (NY).

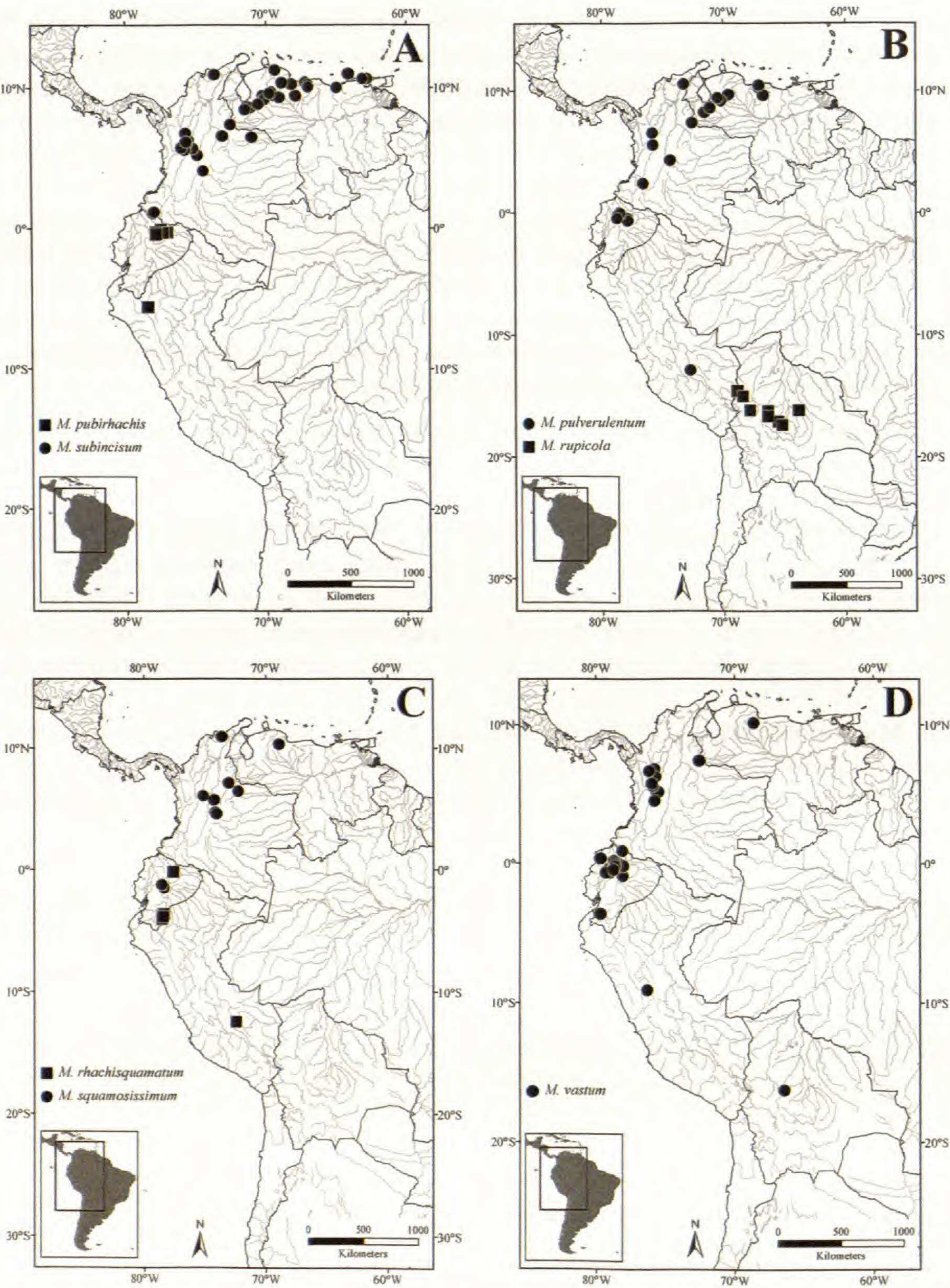


FIG. 36. Distribution of seven species of *Megalastrum* in the Andes. Some species are also known from areas outside the Andean region as here defined; for the worldwide distribution of a species, see under each species description.

Sodirol's original material (Ecuador, Prov. Chimborazo, at the foot of Mt. "El Altar," s.d., *L. Sodiro s.n.*) was not found among the specimens examined by us or by Christensen (1920), and no specimens exist in Sodiro's herbarium at QPLS (María Burbano, pers. comm., 29 Sep 2011). We neotypified the name using the specimen that Christensen cited for his concept of the species, thus preserving the established use of the name.

43. *Megalastrum subincisum* (Willd.) A. R. Sm. & R. C. Moran, Amer. Fern J. 77: 129. 1987 [published 3 May 1988]. *Polypodium subincisum* Willd., Sp. Pl., ed. 4, 5:202. 1810. *Phegopteris subincisa* (Willd.) Fée, Mém. Foug. [Gen. Fil.] 5:243. 1852. *Nephrodium villosum* (L.) Kuntze var. *subincisum* (Willd.) Hook. ex Sodiro, Rescensio Crypt. Vasc. Quit. 54. 1883. *Nephrodium villosum* (L.) Kuntze var. *subincisum* (Willd.) Jenman, comb. superfl., Bull. Bot. Dept. Jamaica n.s. 3:114. 1896. *Dryopteris subincisa* (Willd.) Urb., Symb. Antill. 4: 19. 1903. *Aspidium subincisum* (Willd.) Christ, Bull. Herb. Boiss. sér. 2, 6(1): 56. 1906. *Ctenitis subincisa* (Willd.) Ching, Sunyatsenia 5:250. 1940. TYPE.— VENEZUELA. Distrito Federal: Caracas, [10°30'N, 66°55'W], s.d., *F. Brede-meyer s.n.* (holotype: B-W!-19701). **Figs. 18C, 30H–P, 36A.**

Rhizomes erect, scales 20.0–25.0 × 1–2 mm, ascending to appressed, linear-lanceolate, golden brown, shiny or dull, flat to twisted, denticulate; **leaves** up to 2 m long; **petiole base scales** like those of the rhizomes but spreading to loosely ascending; **laminae** up to 1.5 m long, basally 3-pinnate-pinnatisect, medially 2-pinnate-pinnatisect; **lamina rachises** without hairs abaxially; **basal pinnae** 40.0–60.0 cm long, inequilateral, elongated basiscopically; **pinna rachises** abaxially eglandular, without hairs, scaly, the scales 4.0–6.0 × 0.2–0.3 mm long, golden brown, appressed to loosely ascending, linear-lanceolate, non-bullate, not tortuous, rachises adaxially eglandular, densely pubescent, the hairs 0.5–0.8 mm long, 4- or 5-celled, the scales like those on the abaxial surface; **basal basiscopic pinnules of medial pinnae** not enlarged or overlapping the lamina rachis; **costules** abaxially eglandular, sparsely pubescent (especially distally), scaly, the hairs 0.2–0.3(–0.5) mm long, 2–4-celled, erect to spreading or substrigose, acicular, the scales like those on the pinna rachises abaxially but smaller, 3.0–5.0 × 0.3–0.7 mm, lanceolate, enlarged basally, the adaxial surface pubescent, the hairs 0.5–1.0 mm long, 4- or 5-celled, substrigose; **laminar tissue between veins** glabrous on both surfaces, or near the costules and sinuses very sparsely puberulent abaxially, the hairs ca. 0.1 mm long, erect, acicular; **ultimate veins** visible on both surfaces, abaxially eglandular, sparsely pubescent, non-scaly, the hairs ca. 0.5–0.8 mm long, 2- or 3-celled, spreading, adaxially eglandular, glabrous; **laminar margins** eglandular, ciliate, the hairs 0.1–0.3 mm long, 1- or 2-celled, spreading to substrigose; **indusia** absent; **spores** cristate.

Distribution.—Mexico, Honduras, Cuba, Jamaica, Haiti, Dominican Republic, Guadeloupe, Dominica, northern Venezuela, and Colombia; 450–2300 (–3200) m.

SELECTED SPECIMENS EXAMINED.—VENEZUELA. **Aragua:** Colonia Tovar, [10°22'N, 67°16'W], 1846, *Funck & Schlim* 412 (BM, NY, P). **Barinas:** Distr. Bolívar, San Isidro, ca. 5 mi NW of La Soledad along Barinas-Sto. Domingo (Edo. Mérida) road, 1000 m, 8°50'N, 70°35'W, 19 Nov 1982, *Smith et al.* 1398 (MO). **Carabobo:** Limite Distr. Bejuma Distr. Montalban, Cordillera de la Costa, vertiente norte, al este de la carretera Bejuma-Canoabo, al este de Las Rosas, faldas superiores y fila de la montaña, bosque secundario y cafetales, 950–1100 m, 10°16'N, 68°15'W, 26 Dec 2001, *Meier* 8768 (NY). **Distrito Federal:** Upper Catuche wood (above 1400 meters), near Caracas, above 1400 m, [10°30'N, 66°55'W], 8 Jun 1921, *Pittier* 9595 (GH, NY). **Miranda:** Distr. Guaicaipuro, Cordillera de la Costa, Serranía del Interior, vertiente norte, 6 km distancia aérea al S del pueblo Altagracia de la Montaña, cuenca de la Quebrada Agua Fría, 800 m, 10°04'30"N, 67°03'W, 3 Mar 2002, *Meier & Nehlin* 8939 (NY). **Falcón:** Sierra San Luis, cerca del Hotel Parador, 1500 m, [11°12'N, 69°43'W], 25 Aug 1978, *Wingfield & van der Werff* 6562 (U, UC). **Lara:** Morán, carretera Villanueva y Ojo de Agua, SE de Guarico, 1500 m, [9°37'N, 69°47'W], 6 Mar 1983, *Ortega et al.* 1635 (NY). **Mérida:** Dpto. Sucre, Estanquez-Páramo, Las Coloradas, 1600–1200 m, [8°27'N, 71°30'W], 16 Sep 1984, *Ortega & Berti* 2120 (NY). **Nueva Esparta:** Isla de Margarita, Juan Griego trail, 450 m, [11°00'N, 64°10'W], 29 Jul 1903, *Johnston* 187 (NY, S). **Portuguesa:** Guanare, 2300 m, 8°39'N, 71°21'W, 24 Nov 1985, *Ortega & van der Werff* 2938 (MO, NY, UC). **Sucre:** Distr. Arismendi, Península de Paria, SE de Carúpano, NE de Maturincito, Cerro La Cerbatana a lo largo del camino de La Sierra al caserío Guárico y subiendo la fila, 650–850 m, 10°38'N, 63°10'W, 9 Jan 2005, *Meier et al.* 11193 (NY). **Trujillo:** entre las antenas de relevo en el Páramo de Guaramacal y la Vega de Guaramacal, 9°13'N, 70°10'W, 23–24 Jul 1984, *Ortega et al.* 2025 (MO). **Vargas:** Monumento Natural Pico Codazzi, Carretera Colonia Tovar-La Victoria, Sector Matapalo, 1950 m, 10°26'N, 67°17'W, 23 Jun 1999, *Mostacero & Howorth* 209 (VEN). **Yaracuy:** Distr. Bolívar, Cordillera de la Costa, Serranía de Aroa, S del pueblo Aroa, 1300–1400 m, 10°23'N, 68°54'W, 25 Aug 2002, *Meier & Flauger* 9107 (VEN).

COLOMBIA. **Antioquia:** Mpio. Angelópolis, vereda Romeral, Hacienda La Argentina, quebrada Las Animas, 2050–2130 m, 6°08'22.9"N, 75°41'58"W, 20 Nov 2005, *Rodríguez* 5629 (HUA, NY); Mpio. Betania, alrededores de parcela permanente (UN), 1900–2100 m, 5°44'10"N, 76°00'11"W, 5 Nov 2004, *Rodríguez et al.* 4589 (HUA, NY). **Arauca:** Sarare, Santa Librada, 1300–1600 m, [6°29'N, 71°02'W], 24–25 Mar 1959, *Bischler* 1951 (BM, MICH). **Choco-Antioquia,** 2100–2200 m, 4 Apr 1971, *Lellinger & de la Sota* 917 (US). **Cundinamarca:** Mpio. de Venecia, Vereda Las Mercedes, alrededores de la Quebrada La Chorrera, 2200–2300 m, [4°22'N, 78°28'W], 24 Jul 1981, *Díaz* 3130 (MO). **Magdalena:** Santa Marta, 1219 m, [10°55'N, 73°38'W], Mar 1898–1901, *Smith* 1047 (B, BM, F, GH, K, MICH, MO, NY, P, S, U, US, VT). **Nariño:** Ricaurte, sendero hacia Hondón, 1800 m, [1°07'N, 70°14'W], 25 Jun 1995, *Sánchez-Baracaldo* 64 (MO, UC). **Norte de Santander:** road from Pamplona to Toledo, crossing the divide between Río La Teja and Río Mesme, 2800–3000 m, [7°22'N, 72°39'W], 27–28 Feb 1927, *Killip & Smith* 19998 (NY). **Santander:** vic.

of Las Vegas, 2600–3000 m, [6°33'N, 73°08'W], 21–23 Dec 1926, *Killip & Smith 16136* (NY). **Tolima:** Mariquita, Combaima, 1200 m, [5°12'N, 74°54'W], Jan 1843, *Linden 1020 p.p.* (B, P).

Megalastrum subincisum is characterized by pinna rachises abaxially without hairs but with linear-lanceolate, golden brown scales. The veins adaxially are glabrous to subglabrous (only one or two hairs present), and sparse hairs are often present on the costules abaxially, especially distally. In South America this species greatly resembles *M. aureisquamum* from Peru and Bolivia. They can be distinguished morphologically only by the characters of the rhizome scales as given in the key.

Christensen (1920) construed *Megalastrum subincisum* in the wide sense, occurring from Mexico to Bolivia. He admitted much variation in the type of laminar scales and the presence versus absence of hairs and glands. We find, however, that indument characteristics can be used to divide *M. subincisum* into smaller, less variable species. In this restricted sense, *M. subincisum* is more narrowly distributed than conceived by Christensen, occurring only in the Mexico and Honduras, the West Indies, and Colombia and northern Venezuela. Most of the Central American specimens identified by Christensen as *M. subincisum* are referable to *M. galeottii* (M. Martens) R. C. Moran & J. Prado (Moran & Prado, 2010).

44. *Megalastrum subtile* R. C. Moran, J. Prado & Sundue, *sp. nov.* TYPE.—ECUADOR. Morona-Santiago: small ravine ca. 7 km N of Limón, 2°54'42"N, 78°24'03"W, 960 m, 3 Mar 2005, R. C. Moran, D. Trujillo, L. Salazar & D. Aviles 7608 (holotype: QCA!; isotypes: NY! [barcode 1053900], QCNE!). Figs. 13D, 14A, 35O–U.

Rhizomes erect, scales $10.0-20.0 \times 1-2$ mm, ascending, linear, brown, dull, firm, the margins denticulate, the surfaces smooth (not setulose); **leaves** up to 1.0 m long; **petiole base scales** like those of the rhizomes but spreading to 1.0 m long; **laminae** 0.5–0.6 m long, basally 2-pinnate-pinnatisect, loosely ascending; **lamina rachises** without hairs abaxially; **basal pinnae** ca. 20 cm long, equilateral or nearly so; **pinna rachises** abaxially eglandular, without hairs, sparsely scaly, the scales $3.0-4.0 \times \text{ca. } 0.1$ mm, dull brown, appressed to loosely spreading and ascending, filiform to linear, slightly tortuous, entire, adaxially pubescent, sparsely scaly or lacking scales, hairs ca. 0.3 mm long, antrorsely strigose, the scales ca. 1.0×0.1 mm, filiform, entire, appressed, dull, brown; **basal basiscopic pinnules of medial pinnae** not enlarged or overlapping the lamina rachis; **costules** abaxially eglandular, sparsely pubescent and scaly, hairs ca. 0.2–0.4 mm long, 2- or 3-celled, ascending to strigose, the scales filiform, dull brown, entire, adaxially pubescent, the hairs like those on the pinnae rachises adaxially; **laminar tissue between veins** abaxially and adaxially eglandular, glabrous; **ultimate veins** abaxially visible, glabrous, adaxially obscure, glabrous; **lamina margins** eglandular, ciliate, the hairs 0.2–0.3 mm long, 1- or 2-celled, acicular, ascending to substrigose; **indusia** absent; **spores** cristate.

Distribution.—Ecuador, eastern side of the Andes; 900–1180 m.

SPECIMENS EXAMINED.—ECUADOR. **Morona-Santiago**: trail along Río Inimkis, ca 3 km NE of village of Inimkis (San Luis) toward foothills of Cord. Cucutú, 900–1000 m, 02°23'S, 78°06'W, 14 Nov 1995, Øllgaard & Navarrete 1426 (AAU). **Napo**: Archidona, Reserva de Biósfera Sumaco, cordilla de Galeras, bosque protector de la comunidad de Mushullacta, 1180 m, 0°45'50"S, 77°33'28"W, 27 Mar 2003, Huaylla 831 (MO, QCNE, UC).

Among the decomposed species of *Megalastrum*, *M. subtile* is distinctive by relatively small leaves (up to 1 m long) and the pinna rachises abaxially hairless with filiform to linear entire scales. It resembles *M. martinicense* by lack of hairs and filiform scales, but that species differs by large leaves, strongly denticulate scales, and occurrence in northern Venezuela and Colombia. Also similar is *M. reductum*, which differs most conspicuously by pinna rachises abaxially densely and uniformly pubescent by minute hairs. The specific epithet refers to subtle differences between this species and *M. reductum*.

45. *Megalastrum tepuiense* R. C. Moran, J. Prado & Sundue, *sp. nov.* **TYPE**.—VENEZUELA. Bolívar: Sierra de Lema, Cabeceras del Río Chicanan, 80 km (en línea recta) al SW de El Dorado, at base of high NNE-facing sandstone bluffs, 6°05'N, 62°W[sic], 500 m, 27 Aug 1961, J. A. Steyermark 89513 (holotype: VEN! [barcode 52682]; isotypes: NY! [barcode 000870956], US! [barcode 00798656, 00798657, 00798658]). **Figs. 13B, 30E–G, 32D.**

Rhizomes not seen; **leaves** up to ca. 1.1 m long; **petiole base scales** 12.0–20.0 × 0.3–0.5 mm, ascending to spreading, filiform, golden brown, lustrous, flat or twisted, denticulate; **laminae** 0.4–0.7 m long, basally 3-pinnate-pinnatisect, medially 2-pinnate-pinnatisect; **lamina rachises** without hairs abaxially; **basal pinnae** 25.0–35.0 cm long, inequilateral; **pinna rachises** abaxially eglandular, glabrous, sparsely scaly, scales up to 3.0 × 0.2 mm, light brown, linear-lanceolate, lustrous, spreading to slightly appressed, flat or twisted, subentire to sparsely denticulate, adaxially eglandular, densely pubescent, scaly, the hairs 0.5–1.0 mm long, 3–6-celled (the contents of the cells brown), spreading, scales like those on the abaxial surfaces but sometimes with bifid teeth; **basal basiscopic pinnules of medial pinnae** not enlarged or overlapping the lamina rachis; **costules** abaxially eglandular, sparsely pubescent, scaly, the hairs 0.5–1.0 mm long, 3–6-celled, spreading, acicular, scales like those of the pinna rachises abaxially but shorter, up to 2 mm long, adaxially eglandular, densely pubescent with hairs like those of the pinna rachises, scales absent; **laminar tissue between veins** on both surfaces eglandular, glabrous; **ultimate veins** on both surfaces visible, abaxially eglandular, sparsely pubescent, the hairs like those of the costules, adaxially pubescent, the hairs 0.5–1.0 mm long, spreading, whitish; **lamina margins** eglandular, ciliate, the hairs 0.2–0.3 mm long, 1- or 2-celled, spreading; **indusia** absent, but a tuft of acicular hairs 0.2–0.5 mm long often visible in the center of the sorus; **spores** cristate.

Distribution.—Venezuela, known only from the type; 500 m.

Megalastrum tepuiense is characterized by decompose laminae, petiole bases with linear-lanceolate scales, pinna rachises abaxially without hairs but with long, linear-lanceolate scales, and costules and veins on both surfaces pubescent by whitish hairs 0.5–1.0 mm long, 3–6-celled. This species and *M. adenopteris* are the only species of *Megalastrum* with acicular hairs on fugacious indusia (the indusia often apparently absent in mature sori). Only two other species of *Megalastrum* occur in the tepuis region of southern Venezuela: *M. biseriale* and *M. crenulans*. The first species can be readily distinguished by 1-pinnate-pinnatifid laminae, and the second by large, persistent indusia.

Similar is *Megalastrum praetermissum*, which differs by the laminae abaxially between the veins minutely and finely pubescent, rachis scales strongly denticulate, and sori without acicular hairs.

Megalastrum tepuiense resembles *M. subincisum* by lamina dissection and pinna rachises abaxially glabrous. It differs by costules and midribs of the ultimate segments abaxially pubescent by long (0.5–1.0 mm) straight whitish hairs (vs. glabrous to sparsely and inconspicuously pubescent with hairs only 0.2–0.5 mm long). *Megalastrum tepuiense* occurs only in southern Venezuela and does not overlap geographically with *M. subincisum*, which occurs in northern Venezuela, Colombia, and the Antilles.

- 46. *Megalastrum vastum*** (Kunze) A. R. Sm. & R. C. Moran, Amer. Fern J. 77: 129. 1987 [published 3 May 1988]. *Polypodium vastum* Kunze, Linnaea 9:50. 1834. *Phegopteris vasta* (Kunze) Mett., Fil. Lechl. 2:27. 1859. *Nephrodium vastum* (Kunze) Hieron., Bot. Jarb. Syst. 34:446. 1904, *nom. illeg.*, non Baker (1867). *Dryopteris vasta* (Kunze) Hieron., Hedwigia 46:347. 1907. TYPE.—PERU. Huánuco: “inter Pampayaco et Cocheros et ad Ventanilla de Cassapi,” 1829, E. Poeppig 217 (lectotype, designated by Tryon and Stolze, 1991: B! [barcode 200069274, 200069276, 200069277]). **Figs. 9L–Q, 33A, 36D.**

Polypodium extensum C. Presl, Rel. Haenk. 1:26. 1825, *nom. illeg.*, non Forster (1786). TYPE.—PERU. s.d., *Haenke s.n.* (holotype: PR-n.v., fotos BM!, NY!).

Rhizomes erect, scales 10.0–20.0 × 0.7–1.0 mm, appressed to spreading, linear-lanceolate, brown, dull or lustrous, twisted, sparsely denticulate; **leaves** linear-lanceolate, brown, dull or lustrous, twisted, sparsely denticulate but spreading to 1.0–2.2 m long; **petiole base scales** like those of the rhizomes but spreading to 1.0–2.2 m long; **laminae** 1.0–1.5 m long, basally 3-pinnate-pinnatifid, loosely ascending; **lamina rachises** pubescent abaxially; **basal medially** 2-pinnate-pinnatisect; **pinna rachises** abaxially eglandular or rarely sparsely glandular, densely and evenly puberulent, sparsely scaly, the glands (when present) sessile, spherical, yellowish, the hairs 0.1–0.2 mm long, 1–3-celled, acicular or lax, erect to strigose, the scales up to 3.5 × 0.5 mm, entire or with a few teeth distally, flaccid, pale brown, adaxially densely pubescent, eglandular, the hairs 0.6–1.0 mm long, 5–7-celled; **basal basiscopic**

pinnules of medial pinnae not enlarged or overlapping the lamina rachis; **costules** abaxially eglandular or nearly so, densely pubescent, sparsely scaly, the hairs like those of the pinna rachises, the scales ca. 1×0.2 mm, like those of the pinna rachises, adaxially with indument like that of the pinna rachises but scales absent; **laminar tissue between veins** abaxially eglandular or rarely glandular, densely pubescent, the hairs ca. 0.1 mm long, 1(–2)-celled, erect to curved-ascending or appressed, acicular, glands ca. 0.1 mm long, 2-celled, stalked or sessile, yellowish to orangish; adaxially puberulent, the hairs like those on the abaxial surfaces, often more abundant toward the segment margins; **ultimate veins** visible on both surfaces, pubescent on both surfaces or sometimes glabrous adaxially, eglandular or very sparsely glandular, the hairs and glands like those on the laminar tissue between the veins, or hairs sometimes longer, being 0.5–1.0 mm long, 3–5-celled; **lamina margins** eglandular, ciliate, the hairs 0.2–0.3 mm long, 1–3-celled, acicular, substrigose, ascending; **indusia** consisting of a tuft of minute reddish fugaceous hairs (often apparently absent); **spores** cristate.

Distribution.—Venezuela, Colombia, Ecuador, Peru, Bolivia; 400–2200 m.

SELECTED SPECIMENS EXAMINED.—VENEZUELA. **Yaracuy**: Distr. Nirgua, Cordillera de la Costa, Macizo de Nirgua, SW de Nigua, entre el Picacho de Nirgua y San Antonio-Buenos Aires, 1200–1400 m, $10^{\circ}08'N$, $68^{\circ}38'W$, 5 Mar 2004, *Meier & Nehlin 10084* (UC).

COLOMBIA. **Antioquia**: Mpio. Liborina, Vereda Barrio Nuevo, quebrada La Honda, límites con el municipio de Sabanalarga, 1910 m, $6^{\circ}46'54.3''N$, $75^{\circ}47'34.2''W$, 26 Sep 2002, *Rodríguez et al. 3636* (HUA, NY). **Caldas**: Pueblo Rico [Neira], Cordillera Occidental, Vertiente Occidental, 1700–1900 m, $[5^{\circ}08'N$, $75^{\circ}31'W]$, 17 Feb 1946, *von Sneider 5236 p.p.* (F, US). **Norte de Santander**: Cordillera Oriental, region del Sarare, Hoya del Río Cubugon entre El Caraño y El Indio, 600–470 m, $[7^{\circ}01'N$, $72^{\circ}11'W]$, 12 Nov 1941, *Cuatrecasas 13021* (GH). **Risaralda**: El Cedral, trocha a El Silento, 20 km de Pereira, 2140 m, $[5^{\circ}18'N$, $75^{\circ}42'W]$, 15 Oct 1989, *Rangel et al. 5762* (MO).

ECUADOR. **Bolívar**: Chazo Juan, 600 m, $[0^{\circ}23'S$, $79^{\circ}05'W]$, 1943, *Acosta 6517* (F). **Carchi**: near Maldonado, 1400 m, $[0^{\circ}54'N$, $78^{\circ}06'W]$, 29 Jul 1989, *van der Werff & Gudiño 10711* (AAU, MO, NY). **Chimborazo**: El Limón, Mt. Chimborazo, 1000 m, $[0^{\circ}28'S$, $78^{\circ}49'W]$, Jul 1860, *Spruce s.n.* (K). **Cotopaxi**: Cantón La Mana, Reserva Ecológica Los Ilinizas, sector del Brasil, acceso desde La Carmela, Cordillera Occidental, 1480 m, $0^{\circ}40'37''S$, $79^{\circ}05'09''W$, 13 Jul 2003, *Silverstone-Sopkin 9088* (MO, QCNE). **El Oro**: Road from Pinas to Sta. Rosa, Km 12.5, 860 m, $[3^{\circ}38'S$, $79^{\circ}44'W]$, 7 Oct 1979, *Dodson et al. 8958* (US). **Esmeraldas**: Quininde, Bilsa Biologica Station, Mache mountains, 35 km W of Quininde, 5 km W of Santa Isabel, 400–600 m, $0^{\circ}21'N$, $79^{\circ}44'W$, 14 May 1995, *Clark & Watt 862* (MO, QCNE). **Los Ríos**: Bosque protector Cerro Samana, SWW of caluma, NE part of Hda La Clementina, 600–730 m, $0^{\circ}40'S$, $79^{\circ}20'W$, 29 Feb–1 Mar 1996, *Ollgaard 1559* (AAU). **Napo**: Oyachachi, $[0^{\circ}12'S$, $78^{\circ}04'W]$, Feb 1901, *Sodiño s.n.* (BM, P). **Pichincha**: Cantón Quito, Río Guajalito Reserve, 10 km W of Chiriboga, Km 59 of old road Quito-Santo

Domingo, 1900 m, 0°14'S, 78°48'W, 10 Jul 1991, *Fay & Fay* 3352 (AAU, MO, QCA, QCNE); New road Sto. Domingo-Quito 6–8 km E of Tandajapa, 1150 m, [0°10'S, 78°46'W], 23 Jan 1981, *Balslev et al.* 1693 (AAU, MO, NY).

PERU. **Huánuco**: Leoncio Prado, km 478 on Lima-Tigo Maria road, Thicket along road, following stream to waterfall, 1400 m, [9°05'S, 76°20'W], 6 Jun 1981, *Young & Sullivan* 852 (MO).

BOLIVIA. **Cochabamba**: Chapare, Territorio Indigena Parque Nacional Islboro-Secure, Cordillera de Mosetenez, Laguna Carachupa, 1300 m, 16°14'S, 66°25'W, 29 Aug 2003, *Kessler & Jiménez* 12995 (UC).

Among the large decompose species of the genus, *Megalastrum vastum* is characterized by pinna rachises evenly pubescent abaxially by hairs 0.1–0.2 mm long, pinna rachis scales entire or nearly so, the tissue between the veins on both surfaces pubescent by short hairs ca. 0.1 mm long, and indusia absent. In many specimens, the hairs on the adaxial surface of the laminae are more frequent toward the margins. Glands are often lacking on the laminar tissue and veins abaxially, except for *Øllgaard* 1559 and *Balslev* 1693 which have spherical, sessile, orange glands abaxially along the veins.

Megalastrum vastum resembles *M. aureisquama* and *M. mollicoma* in lamina size and cutting but differs from by the laminae between the veins adaxially with hairs ca. 0.1 mm long, acicular, hyaline, appressed, ascending (vs. longer and lax). Also, its scales differ, being thinner, more flaccid, dull, and often brown; in contrast, those of *M. aureisquama* and *M. mollicoma* are firmer, shiny, and yellowish brown. The scales of the lamina rachises are inconspicuous in *M. vastum*, but conspicuous in *M. aureisquama* and *M. mollicoma*. *Megalastrum vastum* also greatly resembles *M. oreophilum*, a species that differs by petiole and rachis scales golden brown and denticulate (vs. dark brown and entire or nearly so).

Christensen (1920) had a mixed concept of this species. Some of the specimens he cited are considered by us to represent different species. The specimens he cited of *Megalastrum vastum* from Costa Rica represent either *M. skutchii* or *M. palmense* (Moran and Prado 2010); one from Colombia (*Lehmann* 8924) represents *M. reductum*; the specimen he cited from Paraguay (*Hassler* 10421) represents *M. umbrinum* (C. Chr.) A. R. Sm. & R. C. Moran (Moran et al. 2009a); and the specimen from Peru (*Spruce* 4718) represents *M. miscellum*.

Photos distributed by US (Morton negative 1320) at F, MICH and MO state on their labels that the plant depicted is an isotype of *Polypodium vastum*; however, there is no locality information with the specimen and therefore it is uncertain whether it is a type.

NAMES OF UNCERTAIN APPLICATION

Dryopteris fusca C. Chr., Index Filicum 267. 1905, *nom. nov.* for *Nephrodium polylepis* Sodiro, non Baker (1891). TYPE.— ECUADOR. Pichincha: “Crece

en los bosques de los Colorados entre 400–500 m,” s.d., A. Sodiro s.n. (P?-n.v.).

We did not find a type of this name. Sodiro did not designate types, and a specimen of his with sufficient locality information and date was not found by either us or Christensen (1920). A specimen at S (seen on-line) was annotated as the type of *Nephrodium polylepis* Sodiro, but its collection information does not agree with the protologue. The specimen was collected by Sodiro near Oyacachi in January 1901, but has the wrong locality, and the annotation was made after the name *Nephrodium polylepis* Sodiro had been published. The specimen was annotated by Christensen as “*D. vasta*” (= *Megalastrum vastum*).

Polypodium honestum Kunze, Linnaea 9:49. 1834. *Phegopteris honesta* (Kunze) Mett., Pheg. u Aspid. Nr. 59. 1858. *Dryopteris honesta* (Kunze) C. Chr., Index Fil. 271. 1905. *Ctenitis honesta* (Kunze) R. Tryon & A. Tryon, Rhodora 84:127. 1982. *Megalastrum honestum* (Kunze) A. R. Sm. & R. C. Moran, Amer. Fern. J. 77:128. 1987 [published 3 May 1988]. TYPE.—PERU. Huánuco: Pampayacu, 1829, E. Poeppig 22 (LZ, destroyed).

The type was destroyed during WWII, and apparently no duplicates exist. The description is inadequate to apply the name. Morton negative 5268 (MICH, UC, US) shows a photo of a Poeppig collection at H identified as this species, but it is doubtful that this specimen is the type. The photo depicts a plant that is 2-pinnate-pinnatisect, whereas according to the original descriptions the lamina was only 1-pinnate-pinnatifid.

UNUSUAL SPECIMENS

We have not been able to identify the specimens cited below with any of the species recognized above. These specimens might represent new species, but more material is needed to confirm this.

Bonino et al. 1186 (MO). Bolivia. This specimen resembles *Megalastrum aureisquama* but differs by dark appressed scales along the lamina rachises (not golden brown scales). The cutting of the laminae also differs, being only 2-pinnate pinnatifid basally (vs. 3-pinnate-pinnatifid) and with the proximal pinnae soon becoming adnate the pinna rachises distally. The pinnules are obtuse to acute (vs attenuate or acuminate).

Mellado et al. 2390 (MO). Peru. This specimen resembles *Megalastrum subtile* by filiform to linear scales on the pinna rachises abaxially, but it differs by somewhat larger leaves and costules glabrous abaxially. It occurs at slightly higher elevation (2700 m).

Monteagudo et al. 11879 (MO). Peru. This specimen resembles *Megalastrum ciliatum* by the pubescence between the veins abaxially; however, it differs by laminae less deeply divided, basal pinnae not strongly equilateral, and pinnules obtuse more widely adnate to the pinna rachis.

Steyermark 62438 p.p. (F, VEN). Venezuela. This specimen, from Cerro Trumuquire in the state of Sucre, resembles *Megalastrum biseriale* by small lamina size and by lamina cutting; however, it differs by basal pinnae equilateral, smaller scales on the lamina rachises (2.0–3.0 mm long), and hairs on the abaxial surfaces of the pinna rachises 0.8–1 mm long, whitish, straight. More material is needed before this species can be fully described.

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APPENDIX 1: LIST OF ACCEPTED NAMES

- 1- *Megalastrum acrosorum* (Hieron.) A. R. Sm. & R. C. Moran
- 2- *Megalastrum adenopteris* (C. Chr.) A. R. Sm. & R. C. Moran
- 3- *Megalastrum alticola* M. Kessler & A. R. Sm.
- 4- *Megalastrum andicola* (C. Chr.) A. R. Sm. & R. C. Moran
- 5- *Megalastrum aureisquama* M. Kessler & A. R. Sm.
- 6- *Megalastrum biseriale* (Baker) A. R. Sm. & R. C. Moran
- 7- *Megalastrum bolivianum* M. Kessler & A. R. Sm.
- 8- *Megalastrum ciliatum* M. Kessler & A. R. Sm.
- 9- *Megalastrum clathratum* R. C. Moran, J. Prado & Sundue
- 10- *Megalastrum crenulans* (Fée) A. R. Sm. & R. C. Moran
- 11- *Megalastrum ctenitoides* A. Rojas
- 12- *Megalastrum decompositum* R. C. Moran, J. Prado & Sundue
- 13- *Megalastrum falcatum* A. Rojas
- 14- *Megalastrum fibrillosum* (Baker) R. C. Moran, J. Prado & Sundue

- 15- *Megalastrum fimbriatum* R. C. Moran, J. Prado & Sundue
- 16- *Megalastrum fugaceum* R. C. Moran, J. Prado & Sundue
- 17- *Megalastrum galapagense* R. C. Moran, J. Prado & Sundue
- 18- *Megalastrum hirsutosetosum* (Hieron.) A. R. Sm. & R. C. Moran
- 19- *Megalastrum insigne* R. C. Moran, J. Prado & Sundue
- 20- *Megalastrum marginatum* M. Kessler & A. R. Sm.
- 21- *Megalastrum martinicense* (Spreng.) R. C. Moran, J. Prado & Labiak
- 22- *Megalastrum microsorum* (Kuntze) Stolze
- 23- *Megalastrum miscellum* R. C. Moran, J. Prado & Sundue
- 24- *Megalastrum molle* A. R. Sm.
- 25- *Megalastrum mollicoma* (C. Chr.) A. R. Sm. & R. C. Moran
- 26- *Megalastrum nanum* R. C. Moran, J. Prado & Sundue
- 27- *Megalastrum nigromarginatum* R. C. Moran, J. Prado & Sundue
- 28- *Megalastrum obtusum* R. C. Moran, J. Prado & Sundue
- 29- *Megalastrum oellgaardii* R. C. Moran, J. Prado & Sundue
- 30- *Megalastrum oreophilum* R. C. Moran, J. Prado & Sundue
- 31- *Megalastrum peruvianum* R. C. Moran, J. Prado & Sundue
- 32- *Megalastrum platylobum* (Baker) A. R. Sm. & R. C. Moran
- 33- *Megalastrum pleiosoros* (Hook. f.) A. R. Sm. & R. C. Moran
- 34- *Megalastrum polybotryoides* R. C. Moran, J. Prado & Sundue
- 35- *Megalastrum praetermissum* R. C. Moran, J. Prado & Sundue
- 36- *Megalastrum pubescens* A. Rojas
- 37- *Megalastrum pubirhachis* R. C. Moran, J. Prado & Sundue
- 38- *Megalastrum pulverulentum* (Poir.) A. R. Sm. & R. C. Moran
- 39- *Megalastrum reductum* A. Rojas
- 40- *Megalastrum rhachisquamatum* R. C. Moran, J. Prado & Sundue
- 41- *Megalastrum rupicola* M. Kessler & A. R. Sm.
- 42- *Megalastrum squamosissimum* (Sodirol) A. R. Sm. & R. C. Moran
- 43- *Megalastrum subincisum* (Willd.) A. R. Sm. & R. C. Moran
- 44- *Megalastrum subtile* R. C. Moran, J. Prado & Sundue
- 45- *Megalastrum tepuiense* R. C. Moran, J. Prado & Sundue
- 46- *Megalastrum vastum* (Kunze) A. R. Sm. & R. C. Moran

APPENDIX 2: LIST OF ALL NAMES THAT APPLY TO ANDEAN MEGALASTRUM

The numbers in parentheses refer to the species numbers assigned in the taxonomic treatment (see above). Accepted names appear in bold.

- Alsophila martinicensis* Spreng. (21)
Aspidium araguata Moritz ex Reichardt (21)
Aspidium crenulans Fée (10)
Aspidium erythrostemma Christ (38)
Aspidium lutescens Willd. (38)
Aspidium subincisum (Willd.) Christ (43)
Ctenitis acrosora (Hieron.) Copel. (1)
Ctenitis adenopteris (C. Chr.) Ching (2)
Ctenitis andicola (C. Chr.) Ching (4)
Ctenitis bidecorata Lellinger (6)
Ctenitis biserialis (Baker) Lellinger (6)
Ctenitis crenulata (Fée) Ching (10)

- Ctenitis hirsutosestosa* (Hieron.) Lellinger (18)
Ctenitis honesta (Kunze) R. M. Tryon & A. F. Tryon (see Uncertain Application section)
Ctenitis karsteniana (Poir.) Vareschi (38)
Ctenitis mollicoma (C. Chr.) Ching (25)
Ctenitis pleiosoros (Hook. f.) C. V. Morton (33)
Ctenitis pulverulenta (Poir.) Copel. (38)
Ctenitis squamosissima (Sodirol) Copel. (42)
Ctenitis subincisa (Willd.) Ching (43)
Ctenitis villosula (C. Chr.) Ching (4)
Dryopteris acrosora (Hieron.) C. Chr. (1)
Dryopteris adenopteris C. Chr. (2)
Dryopteris andicola C. Chr. (4)
Dryopteris andicola C. Chr. f. *lehmanniana* (Hieron.) C. Chr. (4)
Dryopteris andicola C. Chr. f. *spruceana* (Hieron.) C. Chr. (4)
Dryopteris biserialis (Baker) C. Chr. (6)
Dryopteris crenulans (Fée) C. Chr. (10)
Dryopteris crenulans (Fée) C. Chr. f. *glandulosa* (Rosenst.) C. Chr. (10)
Dryopteris erythrostemma (Christ) C. Chr. (38)
Dryopteris fusca C. Chr. (see Uncertain Application section)
Dryopteris hirsutosestosa Hieron. (18)
Dryopteris karsteniana (Klotzsch) Hieron. (38)
Dryopteris leptosora C. Chr. (22)
Dryopteris macrotheca (Fée) C. Chr. (6)
Dryopteris microsora Kuntze (22)
Dryopteris mollicoma C. Chr. (25)
Dryopteris oreocharis Sehnem var. *canescens* Sehnem (2)
Dryopteris platyloba (Baker) C. Chr. (32)
Dryopteris pleiosoros Svens. (33)
Dryopteris pulverulenta (Poir.) C. Chr. (38)
Dryopteris squamosissima (Sodirol) C. Chr. (42)
Dryopteris squamosissima (Sodirol) C. Chr. var. *bogotensis* (Hieron.) C. Chr. (42)
Dryopteris subincisa (Willd.) Urb. (43)
Dryopteris subincisa (Willd.) Urb. var. *bogotensis* Hieron. (42)
Dryopteris subincisa (Willd.) Urb. var. *karsteniana* (Klotzsch) C. Chr. (38)
Dryopteris tarapotense (Baker) C. Chr. (32)
Dryopteris vasta (Kunze) Hieron. (46)
Dryopteris villosa (L.) Kuntze var. *tomentosa* Rosenst. (2)
Dryopteris villosa (L.) Kuntze var. *glandulosa* Rosenst. (10)
Dryopteris villosa (L.) Kuntze var. *inaequalis* Gilbert (4)
Dryopteris yungensis Christ & Rosenst. (6)
Megalastrum acrosorum (Hieron.) A. R. Sm. & R. C. Moran (1)
Megalastrum adenopteris (C. Chr.) A. R. Sm. & R. C. Moran (2)
Megalastrum aequatoriense A. Rojas (6)
Megalastrum alticola M. Kessler & A. R. Sm. (3)
Megalastrum andicola (C. Chr.) A. R. Sm. & R. C. Moran (4)
Megalastrum andicola (C. Chr.) A. R. Sm. & R. C. Moran f. *lehmannianum* (Hieron.) Stolze (4)

- Megalastrum aureisquama* M. Kessler & A. R. Sm. (5)
Megalastrum bidecoratum (Lellinger) A. R. Sm. & R. C. Moran (6)
Megalastrum biseriale (Baker) A. R. Sm. & R. C. Moran (6)
Megalastrum bolivianum M. Kessler & A. R. Sm. (7)
Megalastrum ciliatum M. Kessler & A. R. Sm. (8)
Megalastrum clathratum R. C. Moran, J. Prado & Sundue (9)
Megalastrum crenulans (Fée) A. R. Sm. & R. C. Moran (10)
Megalastrum ctenitoides A. Rojas (11)
Megalastrum decompositum R. C. Moran, J. Prado & Sundue (12)
Megalastrum dorsiglabrum A. Rojas (30)
Megalastrum falcatum A. Rojas (13)
Megalastrum fibrillosum (Baker) R. C. Moran, J. Prado & Sundue (14)
Megalastrum fimbriatum R. C. Moran, J. Prado & Sundue (15)
Megalastrum fugaceum R. C. Moran, J. Prado & Sundue (16)
Megalastrum galapagense R. C. Moran, J. Prado & Sundue (17)
Megalastrum hirsutosetosum (Hieron.) A. R. Sm. & R. C. Moran (18)
Megalastrum honestum (Kunze) A. R. Sm. & R. C. Moran (see Uncertain Application section)
Megalastrum insigne R. C. Moran, J. Prado & Sundue (19)
Megalastrum karstenianum (Klotzsch) A. Rojas (38)
Megalastrum laxipilosum A. Rojas (25)
Megalastrum leptosorum (C. Chr.) A. R. Sm. & R. C. Moran (22)
Megalastrum marginatum M. Kessler & A. R. Sm. (20)
Megalastrum martinicense (Spreng.) R. C. Moran, J. Prado & Labiak (21)
Megalastrum microsorum (Kuntze) Stolze (22)
Megalastrum miscellum R. C. Moran, J. Prado & Sundue (23)
Megalastrum molle A. R. Sm. (24)
Megalastrum mollicoma (C. Chr.) A. R. Sm. & R. C. Moran (25)
Megalastrum nanum R. C. Moran, J. Prado & Sundue (26)
Megalastrum nigromarginatum R. C. Moran, J. Prado & Sundue (27)
Megalastrum obtusum R. C. Moran, J. Prado & Sundue (28)
Megalastrum oellgaardii R. C. Moran, J. Prado & Sundue (29)
Megalastrum oreophilum R. C. Moran, J. Prado & Sundue (30)
Megalastrum peruvianum R. C. Moran, J. Prado & Sundue (31)
Megalastrum platylobum (Baker) A. R. Sm. & R. C. Moran (32)
Megalastrum pleiosoros (Hook. f.) A. R. Sm. & R. C. Moran (33)
Megalastrum polybotryoides R. C. Moran, J. Prado & Sundue (34)
Megalastrum praetermissum R. C. Moran, J. Prado & Sundue (35)
Megalastrum pubescens A. Rojas (36)
Megalastrum pubirhachis R. C. Moran, J. Prado & Sundue (37)
Megalastrum pulverulentum (Poir.) A. R. Sm. & R. C. Moran (38)
Megalastrum reductum A. Rojas (39)
Megalastrum rhachisquamatum R. C. Moran, J. Prado & Sundue (40)
Megalastrum rupicola M. Kessler & A. R. Sm. (41)
Megalastrum squamosissimum (Sodirol) A. R. Sm. & R. C. Moran (42)
Megalastrum squamosissimum (Sodirol) A. R. Sm. & R. C. Moran var. *bogotense* (Hieron.) A. R. Sm.
 & R. C. Moran

- Megalastrum subincisum*** (Willd.) A. R. Sm. & R. C. Moran (43)
Megalastrum subtile R. C. Moran, J. Prado & Sundue (44)
Megalastrum tepuiense R. C. Moran, J. Prado & Sundue (45)
Megalastrum vastum (Kunze) A. R. Sm. & R. C. Moran (46)
Megalastrum villosulum (C. Chr.) A. R. Sm. & R. C. Moran (4)
Megalastrum yungense (Christ & Rosenst.) A. R. Sm. (6)
Nephrodium acrosorum Hieron. (1)
Nephrodium biseriale (Baker) Diels (6)
Nephrodium microsorum Hook. (22)
Nephrodium polylepis Sodiro (see Uncertain Application section)
Nephrodium squamosissimum Sodiro (42)
Nephrodium subglabrum Sodiro (32)
Nephrodium vastum (Kunze) Hieron. (46)
Nephrodium villosum L. var. *karstenianum* (Klotzsch) Jenman (38)
Nephrodium villosum L. var. *opacum* Mett. ex Hieron. f. *opacum* Hieron. (4)
Nephrodium villosum L. var. *opacum* Mett. ex Hieron. f. *lehmannianum* Hieron. (4)
Nephrodium villosum L. var. *subincisum* (Willd.) Hook. ex Sodiro (43)
Nephrodium villosum L. var. *subincisum* (Willd.) Jenman (43)
Phegopteris epierioides Fée (21)
Phegopteris hirsuta Fée (38)
Phegopteris honesta (Kunze) Mett. (see Uncertain Application section)
Phegopteris karsteniana (Klotzsch) Mett. (38)
Phegopteris martinicensis (Spreng.) Fourn. (21)
Phegopteris subincisa (Willd.) Fée (43)
Phegopteris vasta (Kunze) Mett. (46)
Polypodium barbatum Desv. (38)
Polypodium biseriale Baker (6)
Polypodium extensum C. Presl (46)
Polypodium honestum Kunze (see Uncertain Application section)
Polypodium karstenianum Klotzsch (38)
Polypodium platylobum Baker (32)
Polypodium pleiosoros Hook. f. (33)
Polypodium pulverulentum Poir. (38)
Polypodium subincisum Willd. (43)
Polypodium tarapotense Baker (32)
Polypodium vastum Kunze (46)

APPENDIX 3: LIST OF EXSICCATAE

The number in parentheses refers to the species numbers assigned in the taxonomic treatment and listed in Appendix 1. Collection numbers in boldface are types.

- Abbott, J. R.: 15112 (39)
 Acebey, A.: 595 (14); 730 (20)
 Acosta, S. M.: 6517 (46)
 Adersen, A.: 9, 84, 774, 887, 1248, 1659, 1819 (33)

- Agostini, G.: 207 (38)
 Aguilar, P.: s.n. (14)
 Albert de Escobar, L.: 943 (39)
 Albert de Escobar, L. et al.: 3900 (43); 4476 (23)
 Alston, A. H. G.: 8026 (38); **8730** (39)
 Altamirano, S. et al.: 826 (3)
 Alvarez, R.: 18 (43)
 André, E.: 91 (38)
 Ankersen, H.: 27 (19); 140 (16); 168 (35)
 Ankersen, H. & Kragelund, C.: **211** (28)
 Arbeláez, A. et al.: 87, 119 (43); 276 (23); 287 (21)
 Arroyo, L.: et al. 1912 (4)
 Asplund, E.: 16407 (39)
 Atehortúa, L.: 107 (46)
 Bach, K.: 1234 (20)
 Baker, M. et al.: 5431, 5772 (6)
 Balslev, H. & Madsen, J.: 10435 (19)
 Balslev, H. et al.: 1693 (46)
 Bang, M.: **2394** (4)
 Barbour, P.: 2394 (37); 2499 (7); 2504 (3); 2587 (19); 3682 (15)
 Barfod, A. et al.: 48891 (18)
 Barrington, D.: 461 (42)
 Beck, G.: 1705 (35)
 Bell, P. R.: 252 (46); 920 (39)
 Betancur, J. et al.: 4663, 4886 (6)
 Bischler, H.: 1951 (43)
 Bittner, J. et al.: 2542 (25)
 Bonino, E.: 72a (7)
 Bonino, E. et al.: 734 (16); 746 (3); 750, 751, 753 (6); 761, 1113 (5); 1116 (31); 1130, 1137a (16); 1160 (5); 1178 (16); 1186 (unusual specimen); 1104, p.p. (16); 1104, p.p. (19)
 Bonino, R.: 66 (7); 117 (19); 143 (7); 178 (18); 258, 279 (19);
 Borgtoft, P. et al.: 104324 (18)
 Boyle, B. et al.: s.n. (3)
 Bredemeyer, F.: **s.n.** (43)
 Brown, [?]: 1339, 1349 (2)
 Buchtien, O.: **419**, 493 (6); 2191 (14); 2192 (3); 2228 (35); 3598 (2); 3609 (23)
 Buchwald, [?]: 39 (35)
 Calatayud, G. et al.: 1401 (5); 2185 (3); 2304, 2911 (5)
 Callejas, R. et al.: 311a (11)
 Camp, W. H.: **3786** (39)
 Campos, J. & Corrales, S.: 3593 (19)
 Campos, J. & García, Z.: 4049 (19)
 Campos, J. & López, P.: 4911 (35)
 Campos, J. & Vargas, W.: 3892 (19)
 Cárdenas, M.: 2849 (2)
 Cardona, F.: 1590 (10)

- Castillón, L.: 40958 (16)
Cerón, E. C.: 1483, 1489 (13)
Clark, J. L. & Watt, C.: 862 (46)
Cook, F. O. & Gilbert, G. B.: 1128 (16)
Cornejo, X.: 8165 (46)
Cornejo, X. & Bonifaz, C.: 5459 (22)
Croat, T. B.: 56541 (42); **71469** (25); 72158 (46)
Croat, T. B. & Menke, M.: 89543 (14)
Croat, T. B. et al.: 91009, 91135A, **91165** (13)
Cuatrecasas, J.: 11185 (35); 13021 (46); 23889 (19)
Daniel, Bro.: 2013 (23); 4473 (19)
Daniel, H.: 1898 (42)
Darwin, C.: **s.n.** (33)
de la Sota, R. E.: 4069, 4298 (16)
Díaz, S.: 3130 (43)
Dodson, C. H. et al.: 7215 (46); 7844 (39); 8958 (46)
Dodson, C. H. & Gentry, A.: 10088 (39); 12280 (22)
Dombey, J.: **s.n.** (2)
Dorr, L. J. & Stergios, B.: 8720 (38)
Dudley, R. T.: 11512 (35)
Eberhardt, D. et al.: 137, 142 (41); 204 (6); 402 (20); 513 (6)
Eliasson, U.: 379, 382, 1354, 1851 (33)
Escobar, L. et al.: 3854 (43)
Evoy, J.: 78 (39)
Fagerlind, F.: 3036 (33)
Fay, A. & Fay, L.: 2051 (14); 2205 (6); 3287 (19); 3316, 3335, 3349, 3350, 3351, 3352 (46); 3370, 3391 (19); 3662, 3663 (35); **3827** (19); 3845 (38); 3870, 3876 (16); 3910, **3919** (37); 4014 (14); 4043, 4046, p.p. (23); 4046, p.p., 4097, 4232, **4250** (35); 4381 (14); **4382** (23); 4403 (35); 4595, 4626 (39)
Fendler, A.: 156, 202 (43); 447 (38)
Fernández, E. et al.: 2362 (4); 2366 (35)
Foster, M. S.: 85–144 (1)
Foster, R. & Wachter, T.: 7423 (14)
Foster, R. et al.: 11598 (14)
Franco, P. et al.: 5095 (6)
Freire, E. et al.: 1480 (16)
Fuentes, A. et al.: 9013 (8); 9034 (41); 11098 (20); 14359 (14)
Funck, H. & Schlim, L. J.: 282 (21); 407, 412 (43); **975** (38); 1575 (43)
Gentry, A. et al.: 22867 (19); 60443 (25); 60492 (25)
Giraldo, F. & Mejía, I.: 2098 (46)
Gonzales, N. et al.: 7 (43)
Grant, M. L.: 10810 (38)
Grubb, P. J. & Guymer, D. A.: 94 (42)
Grubb, P. J. et al.: 1195, 1239 (19)
Guevara, V.: 75 (4)
Hamann, M.: 516, 582, 586, 886, 915, 1216, 1985 (33)
Harling, G.: 5089 (33)

- Harling, G. & Andersson, N. J.: 22459 (12)
 Harling, G. et al.: 7396 (35)
 Herrera, G.: 9130 (25)
 Herrera, G. & Chacón, A. **2794** (11)
 Holdridge, L. R.: 1622 (39)
 Holm-Nielsen, L. & Jeppesen, S.: 1053 (35)
 Holm-Nielsen, L. et al.: 4502 (18); 4507 (35); 4547 (23); 4618 (14); 6999 (16); 7065 (39); 24760 (19);
 24853 (6); 26458 (37); 26896 (14); 26904 (6)
 Hoover, S. W. & Wormley, S.: 1620 (46)
 Hoover, S. W. et al.: **3609** (6)
 Howell, J. T.: 9230 (33)
 Huamantupa, I. & Quispe, W.: 3836, 3837 (16)
 Huaylla, H.: 792 (18); 831 (44)
 Huaylla, H.: et al.: 1554, 1720, 1853, 2655 (16)
 Idrobo, J. M. et al.: 10659 (21)
 Jaramillo, J. & Grijalva, R.: 13607 (46)
 Jiménez, I.: 226 (20); 1203, 1207, 1344 (16); 2177 (6); 2269 (14)
 Jiménez, I. & Gallegos, S.: 844 (41); 877 (4)
 Jiménez, I. & Huaylla, H.: 2518 (20); 2547 (14); 2551, 2583 (20); 2589, 2589 (14); 2590 (20)
 Jiménez, I. & Moguel, A.: 1428 (4); 1489 (16); 1641 (3)
 Jiménez, I. & Serrano, M.: 2398 (26)
 Jiménez, I. et al.: 2468 (2)
 Johnston, J. R.: 187 (43)
 Jørgensen, P. et al.: 65337 (13)
 Kalbreyer, W.: 1561 (38); 1564 (19)
 Kanehira, R.: 179 (14); 184 (18)
 Karsten II, H.: **3** (38)
 Kessler, M & Jiménez, I.: 12995 (46); 12999 (41)
 Kessler, M et al.: 630 (20); 5971 (2); 6167 (16); 6171, 6180 (16); 6285 (2); 6370 (26); 6379 (4); 6381
 (16); 6539 (3); 6908 (5); 6964, 7014 (3); 7033 (31); 7185 (3); 7188, 7189 (16); **7379** (5); 7426 (41);
 7522 (5); 7554 (14); 7630 (20); **7630a** (7); 7631 (35); 7644 (5); 7751 (41); 7789 (5); 7907 (41); 7970,
 8126 (14); 8256 (23); 8680 (14); 9088, 9105, 9488 (16); 9900 (41); 10019B (14); 10774, 10897 (35);
 10982 (14); 11131 (35); 11604 (14); 11621 (35); 11944 (6); **11945** (3); 12948 (14); 12950 (41);
 13393 (14)
 Killeen, T.: 1383 (35)
 Killip, E. P.: 7758 (6); 16659 (38)
 Killip, E. P. & Hazen, T. E.: 8800 (46)
 Killip, E. P. & Smith, A. C.: 15555 (27); 16136, 19998 (43); 20411 (38); **20453** (36); 22779 (2); 24550
 (6); 24659 (14); 26021 (6); 26037 (18)
 Killip, E. P. & Varela, J. D.: 34671 (6)
 Killip, E. P. et al.: 10394 (23)
 Knapp, S. & Mallet, J.: 7022 (24)
 Krömer, T. et al.: 100 (20)
 Labiak, P. H.: 4730 (3); 4731 (6)
 Lehmann, F. C.: 101 (19); **7369** (4); 7416 (19); 8924, 8925 (39)
 Leiva, S. et al.: 1759 (22)

- Lellinger, D. B. & de la Sota, E. R.: 815 (19); 840 (18); 917 (43)
- León, B. et al.: 3047 (31)
- Liesner, R. & Holst, B.: 21585 (10)
- Liesner, R. et al.: 12829 (43)
- Limminghe, A. M. A.: s.n. (38)
- Linden, M.: 184 (21); 243, 843 (4); 844 (38); 1020, p.p. (21); 1020, p.p. (43); 1033 (46); s.n. (21)
- Lindig, A.: 159 (4); 331 (42)
- Little, E. L. & Little, R. R.: 8597 (27); 9415 (1)
- Llully, A. et al.: 101 (16)
- Lugo, H.: 2064 (35)
- Luteyn, L. J. et al.: 6590 (13)
- MacBride, F.: 4846, 4855 (3)
- MacDougal, J. M. et al.: 3886 (11)
- Madriñan, S. & Barbosa, C. E.: 187 (43)
- Madsen, J.: 86916 (22); 87002 (6)
- Madsen, J. & Rosales, C.: 8162 (23)
- Maguire, B. et al.: **36871** (30)
- Martínez, O. & Prado, J.: 1893 (8); 1894 (16)
- Meier, W.: 2862, 8768 (43)
- Meier, W. & Flauger, N.: 9107 (43)
- Meier, W. & Gutiérrez, R.: 12333 (38)
- Meier, W. & Molina, [?]: 9226 (43)
- Meier, W. & Nehlin, S.: 8939 (43); 10084 (46)
- Meier, W. et al.: 11193 (43)
- Mejia, R. J. et al.: 3312, 3517 (4)
- Mellado, L. F.: 1686 (19)
- Mellado, L. F. & Becerra, E.: 1754, 1803, 1835 (3)
- Mellado, L. F. et al.: 2390 (unusual specimen)
- Mille, A.: 114 (16)
- Mille, L.: s.n. (6); s.n. (19)
- Mille, L. J.: s.n. (3)
- Monteagudo, A. et al.: 11879 (unusual specimen)
- Moran, R. C.: 3510 (6); 3522 (16); 3531 (6); 3543 (39); 3546 (6); 3546B (38); 3546A (46); 3567 (1); 3583A, p.p. (7); 3583, p.p. (13); 3591 (6); 3594 (37); 3609 (39); 3689 (13); 3707 (14); **5911** (16); **5917** (26)
- Moran, R. C. & Rohrbach, C.: 5133, 5160 (18); 5200, 5220 (19); 5229 (6); 5380, p.p. (16); 5380, p.p. (26); 5382 (7)
- Moran, R. C. et al.: 5949 (46); 6925 (39); 7443 (6); 7542 (19); 7545 (6); 7608 (44); 7634 (14)
- Moritz, J. W. K.: **202**, p.p. (21); 202, p.p., 385, p.p., 389, 435 (43); 459 (38); s.n. (43)
- Morrone, O. et al.: 2863 (16)
- Mostacero, J. & Howorth, R.: 209 (43)
- Navarrete, H.: **538**, 539, 540 (34); 725 (7); 789 (6); 798, 847, 896 (19); 1684 (6)
- Navarrete, H. & Asimbaya, P.: 1646 (6)
- Navarrete, H. & Øllgaard, B.: 3047 (6)
- Neill, D. et al.: 5956 (6)

- Núñez, R.: 760 (35)
- Núñez, R. & Huaylla, H.: 178 (16); 199 (23); 279 (4)
- Núñez, V. P.: 8929 (2); 13973 (24)
- Øllgaard, B.: 1559 (46); 74637 (6); 74966 (19); 98257 (6); 98379(35); 98410 (13); 98413 (40); 98471 (23); 98888 (6); 98891 (25); 98919 (3); 98930 (16); 98942, 99593 (6); 99738 (37); 99754, 99756 (46); 99763 (13); 99890 (37); 99904 (19); 99993 (6); 100629 (46); 100631 (19); 100743 (14)
- Øllgaard, B. & Borchsenius, F: 100674 (39)
- Øllgaard, B. & Larrea, M.: 98857 (39)
- Øllgaard, B. & Navarrete, H.: 859 (46); 1418 (18); 1426 (44); 1629 (37); 1630 (19); 1635 (35); 1713 (16); 1971 (35); 1992 (14); 2026 (35); 2046 (11); 2755 (3); 2859 (14); 99803 (23); 105622, 105657 (6); 105819 (14); 105853, 105854, 105893 (13); 105912 (6); 105938 (19); 105941, 105947 (16)
- Øllgaard, B. et al.: 2205 (11); **2219** (29); 2233 (11); 2247 (28); 2900 (7); 35799 (19); 35806 (29); 37745, 37844 (46); 57852 (13); 74815 (24); 90906 (7); 90909 (16); 99268 (18); 99554 (19); 99556 (16); 99562 (1); 98468, 98694, 99792 (18); 99923 (14); 100773 (22)
- Ortega, F.: 2934 (43)
- Ortega, F. & Berti, L.: 2120 (43)
- Ortega, F. & Smith, A. R.: 2476 (42)
- Ortega, F. & Stergios, B: 1502 (43)
- Ortega, F. & van der Werff, H.: 2938, 2951 (43)
- Ortega, F. et al.: 1635, 1825 (43); 2013 (38); 2025 (43); 3030 (38)
- Otto, E.: 603, 867 (43)
- Palacios, W.: 4036, 4070 (18); **5844** (40); 10986 (18); 12113 (7); 12645 (16)
- Palacios, W. & Cen, [?]: 13883 (22)
- Palacios, W. & Clark, J.: 12644A (25)
- Palacios, W. & Tirado, M.: 13214 (23)
- Palacios, W. & van der Werff, H.: 3600 (19)
- Palacios, W. et al.: 8764 (14); 8766 (18); 9569 (37); 9724 (6)
- Paniagua C. N. et al.: 4216 (35)
- Pedersen, H. B. et al.: 104322 (35)
- Peyton, B.: 1497 (16)
- Peyton, B. & Peyton, S: 1225 (16)
- Pitman, N. & Bass, M.: 1073 (39)
- Pitman, N. et al.: 762 (39)
- Pittier, H.: 9498, 9595 (43); 10029 (38)
- Plowman, T. et al.: 3942 (37)
- Poeppig, E.: **34** (46)
- Portugal, A. & Jiménez, I.: 452 (41)
- Portugal, A. et al.: 223 (41); 246 (7); 250, 364 (6); 366, 370, 401 (41); **538** (20)
- Quijada, C.: 25 (43)
- Quintana, D. et al.: **41** (41)
- Quipuscoa S. V. et al.: 11 (19)
- Quipuscoa, V. & Bardales, J.: 958 (19)
- Quipuscoa, V. et al.: 1083 (1); 1088 (probably an undescribed species); 2340 (1); 2404 (19)
- Quizhpe, W.: 1746 (40)
- Ramos, J. et al.: 6371, 7057 (3)

- Rangel, O. et al.: 5762 (46)
- Rodríguez, W. et al.: 3209, 3598 (43); 3636 (46); 4589 (43); 4591 (46); 4805 (25); 4905 (43); 4915 (38); 4934 (6); 5559 (36); 5575 (43); 5578 (46); 5594, 5629 (43)
- Rose, J. N.: 22379 (42)
- Rothfels, C. J. et al.: 3714 (19)
- Rusby, H. H.: 425, p.p. (8); 425, p.p. (31); 426, p.p. (31); 426, p.p. (8)
- Sánchez-Baracaldo, P.: 42, 60 (25); 64 (43)
- Sanín, D. et al.: 5176 (39)
- Santa, J. & Escobar, R.: 642 (42)
- Schmit, P. A. et al.: **422** (8)
- Schunke, C.: 45, 46, 47, 66, 87, 225A, 453, 510, 704, 841, 862, 1555 (6); s.n. (18)
- Seidel, R. et al.: 9035 (35)
- Serrano, M. et al.: 5225 (16); 6873 (2)
- Silverstone-Sopkin, P.: 9088 (46)
- Silverstone-Sopkin, P. et al.: 2933 (11)
- Sleumer, H.: 2097 (2)
- Smith, A. R. et al.: 906 (43); 1180 (43); 1249 (38); 1342 (21); 1398 (43)
- Smith, D.: 5260 (35)
- Smith, D. et al.: 2615, p.p. (1); 2615, p.p. (5)
- Smith, D. & Palacios, W.: 2639 (3)
- Smith, D. N. & Vásquez, R.: 4884 (19)
- Smith, H. H.: 1023, 1024 (30); 1047 (43)
- Sodiño, L.: 112 (25); 113 (16); 23827, 23/36 (19); 23/36 (46); 44/145a (25); s.n. (1); s.n. (3); s.n. (6); s.n. (12); s.n. (16); s.n. (19); **s.n.** (25); s.n. (38); s.n. (39); s.n. (42); s.n. (46)
- Soukup, J.: 296 (26); 1032 (6)
- Soukup, S. S.: 3354, 5261 (19)
- Sparre, B.: 13840, 14759 (39); 14898 (46); 16754, 16761 (38); 17168 (28)
- Spruce, R.: 4340 (35); **4656** (32); 4718 (23); **4742** (14); 5257 (25); 5257A (38); **5262** (42); **5295**, p.p. (4); 5295, p.p. (19); **s.n.** (6); **s.n.** (22); s.n. (46)
- Stewart, A.: 914 (33)
- Steyermarck, J. A. & Nilsson, S.: 762 (6)
- Steyermarck, J. A. & Stoddard, A.: 118183 (21)
- Steyermarck, J. A.: 53768 (6); 54713 (19); 62438, p.p. (unusual specimen); **85913** (45); 98970 (43)
- Steyermarck, J. A. et al.: 121505 (43)
- Stolze, R. G. & Stolze, S.: 1667 (38)
- Stübel, M. A.: 896 (23); 142 (1); **903** (18); 943 (35); 852 (19); **998** (6); **418** (42); 770 (6); **s.n.** (1)
- Suárez, O. et al.: 4887 (6)
- Suin, L.: et al.: 1271 (35)
- Sundue, M. A. & Vasco, A.: 1260 (46)
- Sundue, M. A. et al.: 3155 (46); 3265 (11); 3265 (46)
- Tate, G. H. H.: 573 (19); 627 (4); 650 (18); 653 (6)
- Triana, J. J.: s.n. (42); s.n. (4); 615 (21); 639 (42)
- Trujillo, D. et al.: **7608** (44)
- Tryon, M. R. & Tryon, A. F.: 5412 (16); **6103** (27)
- Tuomisto, H. & Ruokalainen, K.: 11724 (24)

- Uribe, L.: 3286, 3362 (4)
- Valenzuela, L. et al.: 3019 (38); 3164 (31)
- van der Werff, H.: 906 (43); 966 (33); **2244**, 2256, 2257 (17); 2267 (33)
- van der Werff, H. & Gudiño, E.: 10711 (46); 11122 (18); 11295 (35); 11369 (7)
- van der Werff, H. & Palacios, W.: 10570 (3)
- van der Werff, H. et al.: 12094 (18); 12324 (19); **12482**, 12506 (12); 13143 (18); **16300** (24); 16720 (26); 18275, 18305 (14); 19150 (18); 19383 (40); 19532 (13); 21116 (40); 21118 (4); 21120 (6); 21125 (5); 21140, **21371** (31); 21715, 21884 (18); **23175**, 23179 (9); 23366, 23424 (3)
- Vargas C. C.: 14685, 11284 (35); 12938, 16837 (16); 17373 (35)
- Vargas, H.: 1295 (39)
- Vargas, I. et al.: 7195 (2)
- Vásquez, R. & Flores, S.: 26345 (19)
- Vasquez, R. et al.: 26569 (19)
- Verleysen, J.: 145, s.n. (35)
- Vogl, C.: 869 (43)
- von Sneidern, K.: 5024 (39); 5236, p.p. (19); 5236, p.p. (46)
- Werner, F. A. & Sundue, M. A.: 2151 (23)
- Wiggins, I.: 661, 18535 (33)
- Williams, L. & Alston, A. H. G.: 10781 (43)
- Wingfield, R. & van der Werff, H.: 6562, 6567 (43)
- Wood, J. R. I.: 14903 (20)
- Woytowski, F.: 6742 (22)
- Wurdack, J. J.: 1030 (19); 1851 (35)
- Young, K. & León, B.: **4958** (15)
- Young, K. & Sullivan, G. A.: 852 (46)
- Zabalaga, M. A.: 16 (20); 1124, 1282 (3)
- Zak, V. & Jaramillo, J.: 3606 (13)
- Zarate, M. & Muriel, E.: 779 (41); 831 (20)
- Zuloaga, O. F.: 6166, 6168 (16)

APPENDIX 4: Distribution of *Megalastrum* species by country in Andean South America. The number in parentheses is the total number of species for each country. Endemics in italic and bold.

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- Argentina (3): *M. adenopteris*, *M. ciliatum*, *M. fugaceum*.
- Bolivia (16): *M. adenopteris*, *M. alticola*, *M. andicola*, *M. aureisquama*, *M. biseriale*, *M. bolivianum*, *M. ciliatum*, *M. fibrillosum*, *M. fugaceum*, ***M. marginatum***, *M. miscellum*, *M. nanum*, *M. peruvianum*, *M. praetermissum*, ***M. rupicola***, *M. vastum*.
- Colombia (18): *M. acrosorum*, *M. andicola*, *M. biseriale*, *M. ctenitoides*, *M. hirsutosetosum*, *M. insigne*, *M. martinicense*, *M. miscellum*, *M. mollicoma*, ***M. nigromarginatum***, *M. oreophilum*, *M. praetermissum*, ***M. pubescens***, *M. pulverulentum*, *M. reductum*, *M. squamosissimum*, *M. subincisum*, *M. vastum*.
- Ecuador (30): *M. acrosorum*, *M. alticola*, *M. andicola*, *M. biseriale*, *M. bolivianum*, *M. ctenitoides*, ***M. decompositum***, *M. falcatum*, *M. fibrillosum*, *M. fugaceum*, ***M. galapagense***, *M. hirsutosetosum*, *M. insigne*, *M. microsorium*, *M. miscellum*, *M. molle*, *M. mollicoma*, *M. nanum*, ***M. obtusum***, ***M. oellgaardii***, ***M. pleiosoros***, ***M. polybotryoides***, *M. praetermissum*, *M. pubirhachis*, *M. pulverulentum*, *M. rhachisquamatum*, *M. reductum*, *M. squamosissimum*, ***M. subtile***, *M. vastum*.
- Peru (25): *M. acrosorum*, *M. adenopteris*, *M. alticola*, *M. andicola*, *M. aureisquama*, *M. biseriale*, *M. bolivianum*, *M. clathratum*, *M. falcatum*, *M. fibrillosum*, ***M. fimbriatum***, *M. fugaceum*, *M. hirsutosetosum*, *M. insigne*, *M. microsorium*, *M. miscellum*, *M. molle*, *M. nanum*, *M. peruvianum*, ***M. platylobum***, *M. praetermissum*, *M. pubirhachis*, *M. pulverulentum*, *M. rhachisquamatum*, *M. vastum*.
- Venezuela (8): *M. crenulans*, *M. martinicense*, *M. oreophilum*, *M. pulverulentum*, *M. squamosissimum*, *M. subincisum*, ***M. tepuiense***, *M. vastum*.
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